The "Kraken"

1849.

German

[Anonymous]

AN ESSAY

ON THE

CREDIBILITY OF THE EXISTENCE

OF THE

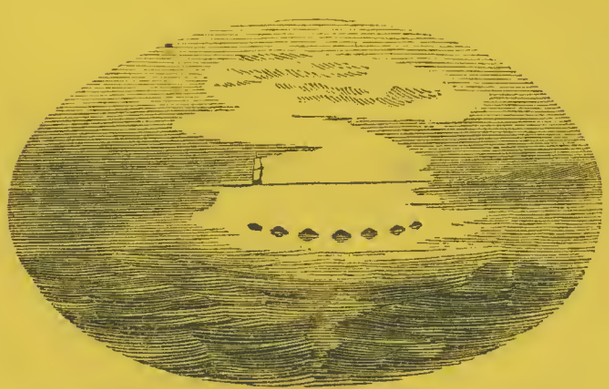
KRAKEN, SEA SERPENT,

AND OTHER

SEA MONSTERS.

With Illustrations.

"Omne ignotum pro magnifico habetur."



LONDON:
WILLIAM TEGG & CO., CHEAPSIDE.
MDCCCXLIX.

See Nature 1881 p. 565 Oct. 13 for
Sea Serpent = Sea Weed.

Appearance of the Kraken, according to Pontoppidan.

From John M. Batchelder

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WORKS, NEWTON.

PREFACE.

THREE years ago the Author of the following pages, having been

ERRATA.

Page 7, 2nd line from bottom, for "a new," read "mere" hypothesis, &c.

Page 10, 22nd line from top, after level, read "with."

paper whose purpose was only to engage the attention of a well-informed auditory for an hour—the best, therefore, being selected, the rest were laid aside.

The short Essay produced under the foregoing circumstances, having performed the office for which it was intended, was cast aside and nearly forgotten, when the recent account of the creature seen by the captain and officers of the Dædalus, and the public interest expressed on the subject in many of the papers of the day, determined the Author, on the persuasion of many of his friends, to lay before the world the fuller fruits of his former researches.

He is aware that his publication can be viewed as little else than a collection of curious facts; though he has endeavoured to string them together in a way likely to assist the reader to arrive at something like definite conclusions on this vexed question, or at least to dispel some of the mistiness with which it is surrounded.

With this view, the Author has adverted as briefly as possible to, or neglected altogether, those accounts which carry improbability or gross mistake on the face of them; and he has wished also to be

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PREFACE.

THREE years ago the Author of the following pages, having been called upon to read a paper before a Provincial Society, one of whose objects is the promotion of the study of Natural History, and fully aware of his slender pretensions to scientific knowledge, selected the subject of Apocryphal Sea Monsters, as one of the few on which his own experience, during twelve years spent at sea, might enable him to offer some little novelty to his hearers, and also because it appeared to him that this question had never yet been handled in a way calculated to elicit its true merits.

At some cost of time and labour, a variety of facts bearing on the subject were collected from such works on Natural History and Science as a limited access to good libraries, and small leisure, furnished opportunity. Nevertheless, the materials so collected were more numerous than could well be condensed within the pages of a paper whose purpose was only to engage the attention of a well-informed auditory for an hour—the best, therefore, being selected, the rest were laid aside.

The short Essay produced under the foregoing circumstances, having performed the office for which it was intended, was cast aside and nearly forgotten, when the recent account of the creature seen by the captain and officers of the Dædalus, and the public interest expressed on the subject in many of the papers of the day, determined the Author, on the persuasion of many of his friends, to lay before the world the fuller fruits of his former researches.

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very sparing in the detail of those attested appearances of marine monsters which are already pretty well known to the scientific world: on the other hand he has been anxious to provoke the attention of the naturalist and comparative anatomist to those more recondite and overlooked circumstances which, philosophically considered, are of importance towards the arrival at the truth of these questionable existences.

The authorities for most of the facts and opinions given, are generally named at the time.

Hoping that his labours (with the valuable aid of PUNCH) will tend to keep the subject alive, until some fortunate event may give a satisfactory solution to the whole question, the Author respectfully dedicates this brochure to those readers who take a grave interest in the desiderata of Natural History and Science.

The Plates are taken from drawings hastily got up for the purpose of illustrating the subject, in respect of size and general outline alone, without pretension to great exactness in the details of the animals represented; though, as far as they go, it is hoped they are generally correct.

CONTENTS.

ON THE

CREDIBILITY OF THE EXISTENCE OF THE KRAKEN,

SEA SERPENT, AND OTHER SEA MONSTERS.

SECTION I.

Remarks on Past and Present State of Natural History—Use of the word "Monster"—Frequent Illusory Appearances at Sea—Also some Mysteries unresolved—Vigia—Description of—Instances—Aitkin's Rock.

"The animals which inhabit the sea are much less known to us than those found upon land, and the economy of those we are best acquainted with is much less understood; we are therefore too often obliged to reason from analogy where information fails, which must probably ever continue to be the case, from our unfitness to pursue our researches in the unfathomable waters."—John Hunter.

Thus spoke the celebrated John Hunter, when treating of the cetaceous tribes, and his remark is used prefatory to the following pages, that the author's claim on the indulgence of his readers may be strengthened while pursuing a subject connected, perhaps, with that of the great anatomist, but whereof the data are still more scanty, and the recourse to analogy therefore the more necessary. The reader must also endeavour to dismiss from his mind the associations of incredulity and jocularity which the very names of sea serpent and kraken are calculated to awaken, and to lend himself dispassionately to the earnest though inexpert attempt to pluck up truth even from the deep abyss.

Among the several characteristics by which the present century will hereafter be honourably remembered, the dissipation of prejudice, and the correction of popular errors will not be the least. In all matters connected with the sciences, old beliefs, however hallowed by time, are scrutinized anew; a new hypothesis is deservedly rejected from arranged systems, theories are guardedly built up by the severe process of inductive reasoning, and all

alleged discoveries submitted to the test of enlightened discussion. Natural history is no exception to these remarks, and from no department of knowledge has more error been extirpated. But has this lessened its interest to its votaries? Far from it. The ground from which the weeds have been cleared is now producing sound fruit abundantly; the real wonders brought to light continually by the indefatigable enthusiasm of the naturalist and physiologist, are fast superseding the old superstitions. When we consider the new creations, as they may almost be termed, of organized life in Australia—the interesting facts continually discovered in animal physiology and comparative anatomy—the researches of the entomologist —the singular creatures brought to light by the indefatigable explorers among the molluscous and zoophyte tribes—the wonders of the animalcular world—the economy of the beehive now laid open, and our increasing knowledge of the instincts and reasoning powers of the lower creation— we may well be content to give up our nursery belief in the existence of the roc, the phœnix, the dragon, the basilisk, the goose-bearing barnacle, and other legendary creatures, or more recent credence in the bird of paradise without legs, the poison of the toad, and other popular errors.

There are no monsters now-a-days, except those of the imagination. Every being and every species has its congeners, and strange or incredible as the vague accounts of unclassed forms of animal life present themselves to our minds, we may rest assured that, if we could bring them within the reach of scientific examination, the supposed monsters would readily arrange themselves in the formulæ of systematic arrangement.

Yet so long as the true characters of the kraken and sea serpent remain among the desiderata of the naturalist, and their very existence is open to question, it may be allowable to apply the word "monster" to them, as a convenient and safe term of reference, and with such conventional meaning, therefore, it will be used occasionally in this essay.

In his research among the works of writers on fishes and mollusca, the author expected to have found the question of the existence of these monsters philosophically handled; but he has been disappointed. In some publications the subject has been confined to mere repetitions of previously-recorded appearances, with one or two new cases as they may have appeared in the newspapers; or it has been alluded to with an admission of the bare possibility of the reality of these creatures; but in many works they have not even been mentioned. A careful collation of the whole body of evidence respecting them seems to be wanting; yet in the hands of an able zoologist such a dissertation would excite an interest which the author of the present pages cannot expect; for if such creatures do exist, none can

appear to our minds so replete with wonder, and if they are unreal, it can scarcely be less interesting to trace out the manner in which some undoubted phenomena have given rise at different periods to such singular misconceptions.

Except the sandy desert, and the boundless prairie, there is no portion of the globe's surface so fruitful in optical illusion as the open sea; and there are no appearances thereon which should be subjected to severer tests than those of which we are about to speak. From the most ancient times, mankind have associated with the ocean, existences the most wild and wonderful. In the days of Plato, the classic Atlantis was believed only recently to have sunk below the surface of the Western Sea; and the legendary story of its inhabitants was still current. In the middle ages, shadowy lands were delineated in every direction on the outskirts of geographical knowledge. Some proved real, as Madeira, whose clouded woods had long been avoided as the region of enchantment, until the English Robert à Machin and his bride found a secure refuge on its shores. Though Madeira turned out a "terra firma," another island, St. Borondon, whose existence about the same parallels appeared equally entitled to belief, has proved a continually flitting delusion, and the name only lives in the pages of the maritime chronicles of the fourteenth and fifteenth centuries. Even in the present day, when fleets of ships passing to and fro the ends of the world, carry cool and educated navigators, free from superstition, versed in science—when the pursuits of the whalers compel the most constant and vigilant exploration, day and night, of the surface of the ocean—still, to the known islet, the surveyed shoal, and the beaconed rock, must be added, among the dangers of the deep, the uncertain Vigia. A short description of the Vigia (and we will confine ourselves to those of the Atlantic ocean) will be useful, for they bear upon our subject—one of the most cogent arguments against the existence of sea monsters, being the infrequency of their appearance, while the opportunities for observation are so greatly multiplied; and the question of the Vigia affording an exact parallel, the satisfactory solution of the mystery of the one would go far to explain that of the other.

"Vigia" is a Spanish word signifying "watch" or "look out," and on charts is usually marked on spots supposed to be dangerous, and which should be approached with caution. Until very lately, these notices abounded on the charts of the Atlantic, and according to the authorities attached to each instance, and vouching for the reality of the danger, they were described generally as rocky pinnacles, or small islets, rising abruptly from unfathomable depths, and appearing level with, or just above, the

surface of the sea. Such dangers laying in the track of navigators, and liable to be fallen in with during the night and the tempest, it is evident, must have addressed themselves with great terror to the imagination of sailors, more especially as well-known dangers of this character do really exist, and are occasionally visited. For instance, Rockall, a high conical rock, seventy or eighty feet above water, laying about two hundred miles N.E. of Ireland, which appears to be the apex of a submarine elevation or bank, over the general extent of which the soundings are from fifty to a hundred fathoms. A still more remarkable instance is the Rocks of Penedo de St. Pedro, in lat. 0° 55′ north, and 29° 19′ west longitude, described by Captain Fitzroy, who landed on them in 1832, as a cluster of craggy rocks, a quarter of a mile in extent, the highest about sixty feet above the surface, apparently the summit of a steep-sided mountain, and unconnected with any bank, as no soundings could be obtained at one or two miles distance, though tried with a line of two hundred fathoms. The nautical reader will probably remember that a Dutch ship was lost on these rocks about three years ago. Most of the crew succeeded in landing upon them, and after some days' severe suffering for want of water, were rescued by a vessel passing. Properly speaking, Rockall, and Penedo de St. Pedro are not vigia, which term is correctly applied to doubtful dangers alone; and in the present state of the navigation of the Atlantic, it is only rocks or shoals laying level, or a little below the surface of the sea, that can remain doubtful: when in this position, however, it is astonishing how long unknown, or at least uncertain, a rock may exist comparatively near the shore, and in the track of vessels. We believe some dangers of this sort are unsettled even on our own coast; but there is a well-known instance in the Dædalus rock, laying some forty miles from Cape St. Vincent, whose reality, doubtful since the middle of last century, was only verified without further question, by two or three vessels striking upon it about thirty years ago.* To illustrate the extreme difficulty of solving the question of the existence of a doubtful rock in the open sea, out of sight of land, and consequently incapable of being brought within the test of cross-bearings, we will abridge from Purdy's Memoir of the Atlantic Ocean, an account of Aitkin's Rock.

The original notice of this danger was published in 1740, wherein it was stated to have been seen in lat. 55° 18′ N., and 11° 14′ W., 94 miles distant from Tory Island, by Captain Aitkin and the crew of the "Friend-

* Jan. 1849. We are informed by Captain Livingston that the existence of the Dædalus rock is still questioned.

ship," *homeward* bound from Virginia. Again in August, 1792, it was seen by the officers, passengers, and ship's company of the ship "Nestor" of Greenock, on her return from New York, in lat. per observation 55° 19′ N., and longitude per account 9° 53′ W. It appeared about four feet below the surface of the water, not five fathoms from the weather-beam, in the form of a horse-shoe. The mate instantly threw an empty barrel overboard; the yawl was got out as soon as possible, and the mate, with four hands and two passengers, were absent nearly two hours in search of the rock; but owing to the ship's drift and a dark cloud which then obscured the atmosphere, they could find neither rock *nor barrel.* The Rev. Mr. Stewart, then a passenger in the "Nestor," saw the rock plainly, with the tangle growing on it. Then follow other accounts—one stating its position at 55° 15′ N., and 10° 40′ W.; appearing three feet out of water, with soundings 30 to 40 feet at a short distance: 30 fathoms off, no soundings with 150 fathoms. In 1804, a Captain Clarke, afterwards of the "Harmony" of Ayr, described it as a half to a whole cable's length long, and about 150 feet wide. The tangle appeared about one foot below the surface, at dead low water, and the ship rubbed alongside. On 27th September, 1826, Jas. Reid, master of the "True Briton," states that he saw it as a little above the water, nearly flat, about 90 feet long and 40 wide; observed lat. 55° 17′ N., and by subsequent run, 56 miles from Tory Island. In 1820, Iver M'Iver, rigger, of Greenock, stated that many years before, while seaman on board a vessel, they fell in with Aitkin's Rock in fine weather. The captain got the boat out and M'Iver was in her. He said the rock was not much under water, had sea-weed on it, and about the size of a ship's launch, bottom upward.

In consequence of several other accounts of this rock, and apprehensions of its danger—no less than six vessels being missing from the port of Glasgow—in 1821, the Chamber of Commerce then memorialized the Admiralty for a survey. In consequence, five government vessels were despatched in sundry cruises, generally two together, in 1824, 1827, and 1829, but the rock was not discovered.

Again, in 1830, the "Onyx" and "Leveret," two gun-brigs, under directions of Captain Vidal, were engaged in this service. They put to sea on 6th June, with a full moon, and commencing their examination at Tory Island, proceeded nearly along its parallel of latitude to the westward of all the given positions of the rock. The two vessels were always in company, distant from each other a mile to a mile and a half by day, and closing at night to half a mile, or as much less as the weather rendered necessary. During the few hours of darkness the vessels were hove to, and the leads

kept going day and night, in depths of 150 to 200 fathoms. In accordance with instructions from the Admiralty, an additional number of hawsers were supplied to the vessels, for the purpose of sweeping for the rock; and with a line of them, amounting to more than 700 fathoms, (three quarters of a mile) a large portion of the suspected ground was subjected to examination. Great pains were taken during spring tides, when the rock might be expected to be uncovered, but the search failed to produce it, and on 31st August, the vessels returned. Mr. Andrew Livingston, a mariner of great intelligence and experience, and himself a large contributor to the work from which the above account is taken, says, in reference to this search, "Captain Vidal's researches do not convince me that Aitkin's rock *does not exist*; for I have no doubt of M'Iver's having told the truth, and Captain Clarke is a man above suspicion: but it is very easy to pass a speck like it very close and not see it; particularly at, or near high water."

Though it may be necessary to advert again to the Vigia, it would be but trespassing on the indulgence of the reader to multiply instances like that of Aitkin's Rock. It may be assumed, that the greater number of these reported dangers are unreal, and have had no better origin than a decaying iceberg, a barnacle-covered wreck, a dead whale, a large tree, piece of timber, or even a large cask, overgrown with shells and sea-weed. Yet some do exist, though of what precise character has still to be determined. If such a monster as the kraken had ever been reported in the Atlantic, one or two of his attendant phenomena might be recognised in some of the stories of the Vigia.

SECTION II.

THE QUESTION FOR PRESENT CONSIDERATION—DIFFICULTIES OF—AS TO DIMENSION—HABITAT—THE SEA—ITS EXTENT—DEPTHS—INHABITANTS—SARGOSSA SEA—PRESSURE OF THE WATERS—TEMPERATURE—EFFECT ON ANIMAL LIFE—INSTANCES OF GIGANTIC SIZE—THE MEGATHERIUM A CONTEMPORARY WITH MAN—LONGEVITY OF FISH, AND THE EFFECT—EAGLE RAYS—CEPHALOPODA.

"Oh Lord how manifold are thy works! in wisdom hast thou made them all: the earth is full of thy riches.

"So is this great and wide sea, wherein are things creeping innumerable, both small and great beasts.

"There go the ships: there is that Leviathan, whom thou hast made to play therein."—PSALM civ. 24—26.

MOST of our readers will doubtless be sufficiently familiar with the ordinary description of the kraken and sea serpent, to be aware that the enormous dimensions assigned to these creatures are the great stumbling-block to belief; especially when combined with the rarity and indefiniteness of their appearance. That a creature should visit the surface of the ocean, whose size and form can be described only by its resemblance to an island, rearing its limbs in the air to the height of ships' masts, or that another of serpentiform shape, whose length is estimated at hundreds of feet, should be plainly seen four or five times in the quarter of a century, and neither of them, during the intervals of their appearance, leave further trace of their existence, living or dead, does indeed make large drafts on our faith. Yet, if arguments can be derived from analogy, showing that such existences are neither impossible nor improbable; that the difficulties attendant on the rarity of their appearance may be met; and still more, if it can be shown that, when stripped of exaggeration (perhaps unavoidable), the dimensions of some of these supposed monsters do not much, if at all, exceed those of known creatures, then the whole question will be one of evidence—open, deservedly, to rigid scrutiny, but not to be rejected altogether because it may fail to clear up all that is doubtful and obscure.

Before going into the evidence, it will perhaps be more in order to state such arguments as may be drawn from analogy and the ascertained phenomena of animal life.

First, then, as to size:—

We see all nature filled with life; and in describing what we see, we use certain terms of magnitude, but in the hands of the Infinite, there need be no scale of dimension, any more than there can be a scale of eternity, or of illimitable space. Within the boundary of the planet we inhabit, a series of proportions has of course become established, which can be applied to all its denizens. The medium terms of this scale are familiar to us; but who shall disclose the beginning or the end of it? We know not the extreme of diminutiveness to which organic life has reached. We *do* know what hitherto has been the limit of our observation, even when aided by the microscope; but so far from these discoveries enabling us to declare that we have attained to the first of the series of beings, we rather find indications of the existence of still minuter forms, expatiating in a world beyond our exploration.* To pursue the ideas suggested here would lead from the present subject; yet the observation may be made, that there seems no necessity for believing that a distinct separation exists between the material and the immaterial worlds; but that rather, in conformity with what we behold elsewhere of the graduated mode in which all things pass into each other, matter also, at the extremes of diminutiveness and expansion, passes into those subtile and intangible essences which are themselves the connecting links with the spiritual. According to the theories of matter, no bodies exist which may not suffer compression; and where compression can take place, there must be space between the ultimate atoms of the substance, and

*The elaborate examinations that have been made regarding infusory animalcules, have brought vast accessions to our knowledge of animated nature. Of these atomic germs of vitality, until lately, little had been discovered beyond the fact of their existence; and indeed many species, on account of their extreme minuteness, had not been observed at all. But the mind becomes overwhelmed and confounded, whilst we read (as Mr. Pritchard, in his Natural History of Animalcules, has enabled us to do) of the organization or vital properties of a living atom, so inconceivably minute, that 500 *millions* of them in a mass would present little more than a sensible point to the unassisted eye. Until the introduction of vegetable colouring matter into the fluid which supplies them with food, these creatures were commonly supposed to be entirely devoid of internal organization, and to be nourished by the simple process of cuticular absorption. This erroneous notion is now set at rest, and an internal structure is discerned in some, equal to, if not surpassing, that of many of the larger invertebrated animals; and comprising a muscular, nervous, and in all probability vascular, system, all wonderfully contrived for the performance of their respective offices.—*Abridged from the Popular Encyclopœdia—Article Microscope.*

where space is, there may be organic life. Unable as we are to affix a limit to that tenuity of form which may be compatible with animalcular existence, neither are we qualified to assign boundaries to size in the opposite direction. Some of the ancient philosophers held that the earth itself was the first of animated beings, not only having life in itself, but the higher attributes of consciousness and soul. It is needless to discuss the merits of that belief, but there is no violation of philosophical probability in imagining some form of animal life, whose magnitude should exceed that of a whale by only a thousandth part of the proportion which the whale bears to one of the beings brought within the scope of our vision by the instrumentality of the solar microscope. Could we calculate the immensity of such a creature, we should find it one to which the most exaggerated kraken were a babe. True, the minuter forms of matter whether organic or inorganic are withdrawn from our notice by the imperfection of our senses, which reason does not apply to objects of bulk. If any such mighty monsters therefore do exist within our planet, their habitation can only be beneath the surface of either the earth or sea. What might be found within the 7000 miles constituting the earth's diameter, we shall probably never know. As far as man has travelled on that line no indication of any living being has been met with. The objects of our inquiry are to be sought for beneath the waters.

Here we have "ample room and verge enough" for the expansion of animal life. Unexplored and unexplorable in its depths, as probably it must ever be, we know this to be the primeval element, in which the creative energies were first developed in animal organization,* we know that it brought forth abundantly, and we speak of it still as one of the types of prolificness. Are we then to rest satisfied with the belief that the tribes which inhabit the shallows of the ocean, or occupy its upper strata, are the sole tenants of the boundless deep? As well may the naturalist, after a transient search along the edge of an American forest, undertake to enumerate its inhabitants—or the botanist presume to publish the Flora of the great western prairie without penetrating beyond its border—as the inquirer into the wonders of the deep, satisfy himself with the discoveries that he is enabled to make on the outskirts of the oceanic world.

* "And God said, let the waters bring forth abundantly the moving [or creeping, in the margin] creature that hath life, and fowl that may fly above the earth in the open firmament of Heaven.

"And God created great whales, and every living creature that moveth, which the waters brought forth abundantly."—Genesis i. 20, 21.

Covering nearly three-quarters of the globe's surface with a mean depth, as calculated by La Place, of 1000 yards, the ocean has its mountains and valleys—the depth of some of the latter probably equal the height of the highest mountains of the land. It has been frequently sounded to 1000 and 1200 fathoms, and in a few instances, to the depth of two and two and a-half miles and more, without reaching the bottom. Can we come to the conclusion that the immense area of an element so suitable for the maintenance of animal life, is only a desert? Is such a conclusion in harmony with the recognised dispensations of the Great Creator, or even with facts, as far as facts can be brought to bear on the question? At whatever depths man has been enabled to gather knowledge, there he has found evidence of organic existences; wherever the sea can be sounded, fragments of shells come up with the armed lead. The spermaceti whale finds his pastures, as Beale supposes, hundreds of fathoms deep down, and he is carnivorous. Darwin, in his Zoology of the Beagle's Voyages, 1832 and 1836, not only expresses his astonishment at the abundance of living creatures, both fish and fowl, great and small, in the upper strata and on the surface of the Pacific Ocean, thousands of miles from land, but describes with wonder, the vast submarine forests off the coasts of Terra del Fuego, swarming, at considerable depths, with animals of the crustacea, nereides, holutheria, &c. For the profusion of life, he likens them to the intertropical forests on the land. Then there is the Sargossa* Sea, or sea of weeds, occupying the very centre of the Atlantic, and showing by the gnawed and broken stems of its fuci, that the whole grows at the bottom *of that probably deepest part* of the ocean. Where is vegetable life, there also may be animal life; and indeed we have ample proof in the corallines, madrepores, and various tribes of the mollusca, that the lower forms of organization abound in the depths of the sea.

It may be objected, that the pressure of the water is so great, even at a thousand fathoms, as to preclude the probability of the habitual existence

*The part of the Atlantic Ocean bearing this name is that central portion distinguished by the weed called "Fucus natans." The name was given by the early Portuguese navigators, who call it Sargaçao or Sargasso, from the form of the seedpods or fruit of the plant which have been called tropical grapes. The fucus natans occupies a tract between 18° and 37° N. lat., and 33° and 43° W. long., more than 1200 miles long and 400 or 500 miles wide. This space is commonly studded over, like an inundated meadow, with the bunches which are in some places very abundant, and in others more dispersed. If we could imagine the surface of a wide extended moor, covered with water, the furze and heath bushes would appear something like the clusters of fucus scattered over the thickest part of the sea. For further description, and also for the reasons leading to the conclusion that the weed grows at the bottom, in the geographical position above indicated, the reader is referred to Purdy's Memoir of the Atlantic.

of locomotive animals at the bottom. This is not proved; Scoresby gives an instance of a stricken and frightened whale sounding (as it is termed) 1000 fathoms deep, and breaking the crown of its skull against the bottom. Surely when one of the mammalia, formed for living at or near the surface, could so easily by its muscular power overcome the supposed pressure of the element, it is conceivable that Infinite Wisdom could so endow his creatures with a structure and functions as to enable them to sustain or evade the pressure of the superincumbent waters.* Some writers have, indeed, professed to calculate the exact depth at which owing to the increasing density of the element, bodies cease to sink; yet experiment shows that the deep-sea lead goes on descending as long as line is given, and it does not stop even at 4000 fathoms, nearly five miles.†

Another objection may be taken in respect of temperature. Our experience hitherto has shown that organic life cannot exist and be propagated, except within certain limits of temperature. What may be the exact point of heat incompatible with the existence of life we need not discuss. In respect of cold, the point at which water becomes ice, as far as we know, suspends the functions of all animal and vegetable life enclosed therein. Now, the data we possess of the temperature of the ocean, are far too scanty to enable us to form any very decided conclusion, especially in respect of the extreme depths; although soundings of 4000 fathoms have been in some rare instances obtained, we have not been able to find any experiments on the temperature beyond about half that depth (two miles). Up to this point the temperature has been found to decrease rapidly at first, more slowly afterwards, until, if the results of the experiments at the greatest depths are to be trusted, it has become stationary, or even shown some trace of *increasing* again. The absolute temperature at the surface, and throughout such depths as have been tried, varies somewhat with the latitude and the state of the atmosphere; but the general results point towards some common temperature at the greatest depths. The reader may judge for himself by examination of the following table, taken in order from the works consulted.

* Darwin the naturalist gives one or two most astonishing instances, under what unexpected conditions animal life is found. "In the mud of the Salinas (salt lakes) of South America, though thoroughly saturated with brine, and containing crystals of sulphate of soda and lime, hardened into a solid layer of salt in summer, numbers of some kind of worm or anellidous animals are found. A species of cancer described in vol. ii. page 205, of Linnæan Transactions, is found in the brine pits at Symington, and in the salt lakes of Siberia.—*Zoology of Beagle's Voyage, page* 77.

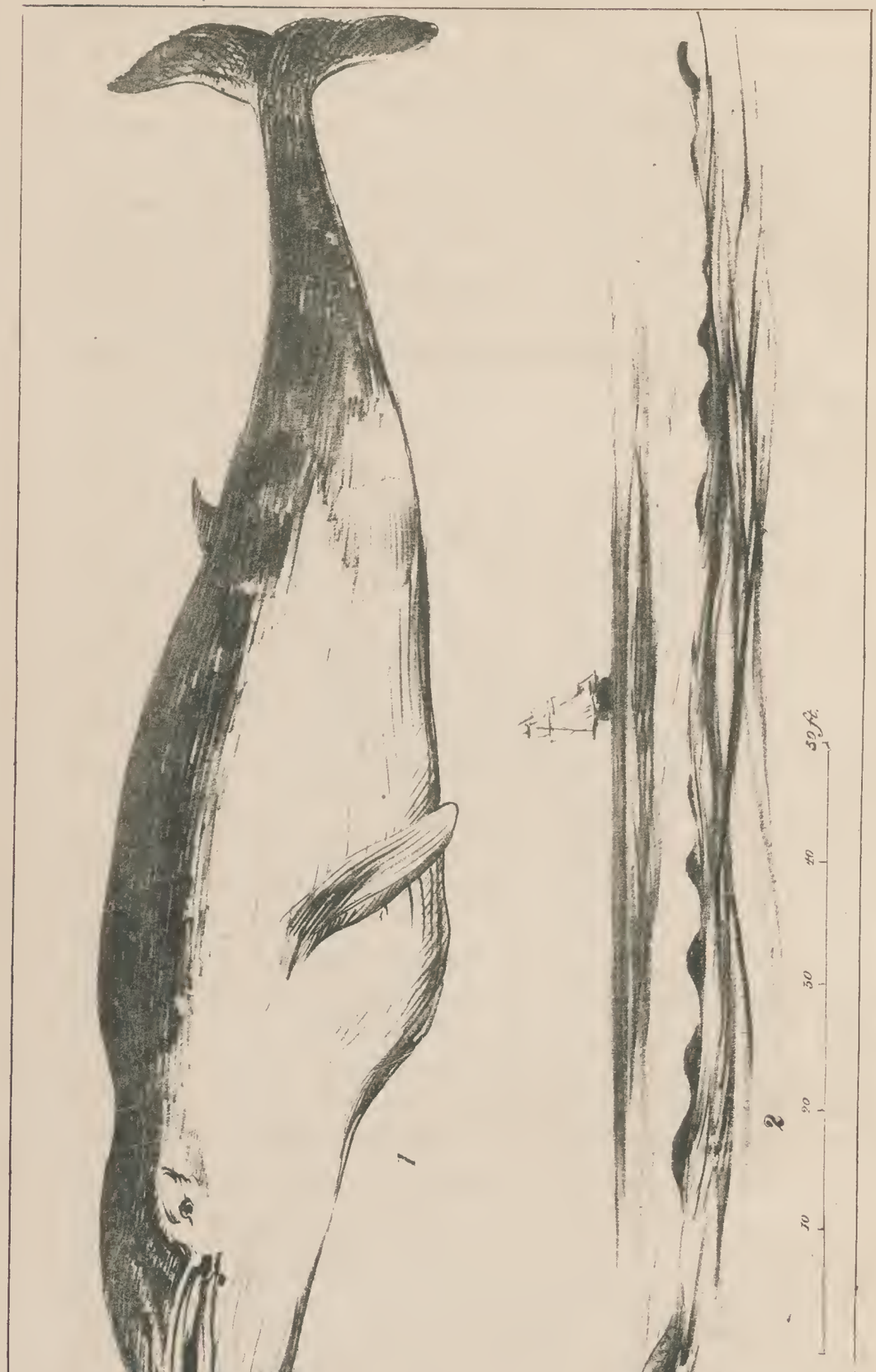
† Franklin's Voyage to the South Pole.

Observer or Authority.	Sea.	Lat.	Long.	Temperature Fahrenheit.			
				Air.	Surf.	At depth in faths.	
Captain Cook	Ethiopic Ocean	24°40′S	..	72½°	70°	80	68°
..	..	58 27 S	27°30′E	31	32	160	33½
Captain Phipps		80 30 N		32	36	60	39
..		65 0 N		66⅓	55	683	40
Krusenstern	Pacific Ocean	56 0 S	146 16 W	83	83	100	61
..	Tropics				78	25	76½
..	..				..	50	71
..	..				..	125	62
Late expeditions to Arctic Circle	Baffin's Bay	71 24 N			36	1005	8½*
..	Cape Walsingham			37	34½	100	30
..	..			..	..	200	29
..	..			..	..	400	28
..	..			..	..	660	25⅓
Scoresby	Sea of Spitzbergen	70 27 N			32-33	300	36-37†
Penny Cyclopœdia, Article "Sea"		58 0 N			54	400	40
..		56 0 S			43	440	41
..	Baffin's Bay				37	400	28
..	..				..	660	25
Capt. Wauchope, Eurydice	Equator	0 0			73	1000	42
An. Livingston	Off Cape St. Vincent			63	63	1	62
..	..			..	..	5	61
..	..			..	..	20	60
..	..			..	..	100	58
..	..			..	..	250	58
Columbian Navigator	Carribean Sea	13 20 N	64 38 W		85	240	48
..	East of Bahamas	22 32 N	71 27 W		77	511	45
..	South Coast of Cuba	..	..		83	1000	45½
..	Windward Passage	19 32 N	75 28 W		84	440	44
..	Isle of Kuston				84	386	43
..	S.S.W. St. Andrew's Isle				83	450	42
..	Mosquito Coast	14 2 N	81 2 W		86½	400	43
..	do.	10 52 N	83 9 W		83	780	41
..	Cape Tiberon, Hayti				80	1035	41
Captain Sabine		20 30 N	83 30 W		83	1000	45
Penny Cyclopœdia	Between Tropics				83	400	49
Captain Beechey	Pacific Ocean	14 22 N		91	88	600	57
..	..	..		..	..	1200	55
..	..	..		..	..	1800	48.5
..	..	..		..	..	2400	49.5
..	..	23 28 N			63	300	62
..	..	..			..	900	50
..	..	..			..	1260	47.5
..	..	..			..	1860	47.5
..	..	58 48 N			54	600	45
..	..	..			..	1200	41.5
..	..	..			..	1962	40.5
..	..	..			..	2652	40.5
Captain Beechey	Atlantic	55 58 S		37	43.5	600	42.5
..	..	..		..	..	1380	42.5
..	..	..		..	..	1980	40.5
..	..	..		..	..	2580	41.5
..	..	12 22 N		83	82	180	71
..	..	..		..	..	360	61
..	..	..		..	..	540	57
..	..	..		..	..	600	58
..	..	..		..	..	720	58
..	..	..		..	..	1320	60

* This result is very curious, and at issue with the ordinary laws according to which water becomes ice. The experiments in Baffin's Bay, and that of Greenland, offer a singular contrast with the results obtained by Captain Scoresby, between Greenland and Spitzbergen. Here in every instance, at 100 to 200 fathoms, the temperature was found to exceed that of the surface by several degrees. Franklin states the same.

† Several experiments.

PLATE 1.



1. Great Northern Rorqual, or Finner Whale, 120 feet.
2. Great Sea Serpent; extreme length, according to most credible accounts.

There is sufficient ground in the above facts to believe that, in certain parts at least of the ocean, there must exist some agency by which the waters of the lower strata acquire greater warmth than could have been anticipated, and certainly there is no evidence to show that they ever lose their fluidity, or cease to continue a medium in which organic life may continue. If there be truth in the theory of the earth's central heat, it may be that the temperature of the lowest depths of the ocean, depths measurable by miles rather than fathoms, may equal or even exceed that of the surface.

When we remember how highly stimulant of increase of size heat is in most divisions of the animal kingdom, it is not inconsistent with analogy to imagine, that in those parts where the energies peculiar to the marine creation exist in largest force and area, there also will be the greatest development of form. We see the oceanic fishes and even those of deep lakes greatly exceeding in size the denizens of the shallow waters, and geologists universally ascribe the giant proportions of the reptiles of former periods to the high temperature then prevailing on the globe.* It will be in place here to enumerate some of the largest creatures both of past and present existence; and to afford a ready standard of comparison, we will commence by naming the great rorqual, black whale, or finner. (See Plate No. 1.) This is probably the hugest of living creatures, attaining a length of 120 feet, with a circumference of 30 to 40 feet; being in bulk the counterpart of a vessel of 300 to 400 tons burthen. Dead specimens have been measured 105 feet in length. The basking shark attains 40 feet, and from the fossil teeth of the white shark occasionally found, it is supposed formerly to have reached a length of 60 feet. The extinct saurians, *if extinct they be*, such as the ichthyosaurus and plesiosaurus attained 20 to 25 feet in the

* It is not intended to press this argument to its full extent, or to insinuate that the higher the temperature, consistent with life, the larger will be the development of animal organization, for this is not borne out by facts either past or present, especially with regard to fishes.

If we refer to the fossils of the distinct geological periods, it is only in the later formations that we find the gigantic remains of the former denizens of the waters, while in the earlier fossiliferous rocks, not only, we believe, are no reptiles discovered, but the same races of fish, sharks for instance, which subsequently expand so enormously, are seen of most diminutive size, measurable by inches instead of yards. The undue presence of carbonic gas in the atmosphere, however favourable for the growth of marine and aqueous vegetation, may account for the non-existence of terrestrial animals in those earlier periods; but this cause would not, we imagine, have anything to do with fishes, the inhabitants of another medium; their undeveloped size, therefore, must rather be referred to the too high temperature of the waters. It is probable that the degree of heat most favourable for expansion of size among fishes, may be fixed at a lower range than that for reptiles, or even terrestrial animals generally.

skeleton alone; but these are pigmies compared with the mighty iguanodon, whose fossil remains indicate a creature 70 feet or more in length. "Imagine this reptile," says one of our geologists, "reinvest its huge bones with the muscles and other integuments, add the armour of scales, and behold a lizard standing six feet from the ground, on limbs whose upper parts exceed the girth of an ox!" We speak of the elephant as the largest of terrestrial living animals, and only smaller than the mammoth of a former geological period; but there are grounds for believing that in the American mastodon there existed a contemporary with man which exceeded both.* The discoveries in the new red sandstone in Connecticut indicate

* In 1842 there was exhibited in this country the skeleton of a megatherium, named by the discoverer, Mr. Albert Koch, Missourium Theristo-caulodon. The leading admeasurements of the bones were as follow:

	Ft.	In.		Ft.	In.
Length of the whole skeleton	30	0	Total breadth of pelvis	7	2
Height	15	0			
Length of the head	6	0	Width from one zygomatic arch to the other	4	0
Longest rib	5	6			
Largest dorsal vertebra	2	6			
Humerus	3	6	Greatest circumference	3	3
			Smallest ditto	2	7
Femur	4	0			
Tibia	2	4	Upper fore-teeth (two), breadth 4 in., length	4	6
Tail, 13 vertebræ	2	7	Do. back teeth (two)	„ 7	0
Fore-foot webbed and clawed	1	3			
Head	1	2			

The tusks, one of which was in its socket, measured 10 feet each, exclusive of the root, and were curved and borne horizontally, extending from point to point along the curvature 21 feet. The bones were solid and without marrow. Mr. Koch considers this creature to have been an inhabitant of large rivers and lakes. It was found in the state of Missouri, near the shores of one of the tributaries of the Osage river. The bones (exhumed in 1840) laid on a stratum of the upper green sand, and were covered to the depth of 14 or 16 feet with layers of alluvium, plastic clay, marl, and recent deposit from the river. But the most singular circumstance related by Mr. K., and which is the chief inducement for this notice, is the following:—"The *second trace* of human existence in connection with these animals, I found during the excavation of the Missourium. There was imbedded immediately under the femur or hind-leg bone, *an arrow-head of rose-coloured flint*, resembling those used by the American Indians, but of larger size. This was the only arrow-head immediately with the skeleton; but in the same strata, at a distance of five or six feet, in a horizontal direction, four more arrow-heads were found; three of these were of the same formation as the preceding; the fourth was of very rude workmanship: one of the last mentioned three was of agate, the others of blue flint. These arrow-heads are indisputably the work of human hands. I examined the deposit in which they were embedded, and raised them out of their position with my own hands."

As Mr. Koch's conclusions as to the contemporaneity of the human race with the living animals which we now only know in their fossil remains, are extremely

that races of birds also once existed on our earth, commensurate in their proportions with its other inhabitants. The length of some of the foot-marks perpetuated on the rock is 15 to 18 inches—the stride four to six feet; giving a biped probably 18 feet high.

Whatever difference of opinion may exist on the doctrine of successive development of organized beings, in respect of the perfection of their structure, it would appear that, in point of size, we lose ground, at least on the land.

Passing by man himself, and the traditions and evidences of the human race having formerly furnished more gigantic specimens than at present, it is certain, if we take history as we find it, that the lower animals, especially some of the reptiles, attained double the dimensions they now do. The American boas grow to 20 and 25 feet—the pythons of the old continent, some ten feet longer; but Livy speaks of a huge serpentiform monster

important, not only to the present inquiry, but to science generally, no apology is offered for adding here the *other instance* alluded to:—

"In October, 1838," says Mr. Koch, "I disinterred the remains of an animal which had clawed feet, and was of the size of an elephant. This deposit was in Gasconnade county, Missouri, on the shores of Burbois river. The principal part of this animal had been consumed by fire, which fire evidently had not been produced by volcanic eruption, but had been formed and kindled mechanically by human hands, as it appeared, for the purpose of destroying the above-mentioned animal, which had been mired here and was unable to extricate itself. . . . . Nine feet beneath the surface, I found a layer of ashes from six to twelve inches in thickness, mingled with charcoal, large pieces of wood partly burned, together with Indian implements of war, as stone arrow-heads, tomahawks, &c.; also more than 150 pieces of rock, varying from three to twenty-five pounds weight, which must have been carried here from the rocky shores of the Burbois river, a distance of 300 yards—these had been thrown evidently with the intention of striking the animal. I found the fore and hind feet standing in a perpendicular position, and likewise the full length of the leg below the layer of ashes, so deep in the mud and water that the fire had no effect upon them. . . . . A few of the teeth appear to have been broken out by the force of the rocks thrown at the head of the animal, and were carried some little distance, so that they escaped in a measure the violence of the fire, and have all the appearance of those of a carnivorous animal."—*Koch's Description of the Missourium Therist.*

From recent inquiry we are enabled to state that Mr. Koch's skeleton of the Missourium Theristo-caulodon, on being submitted to the scientific examination of Professor Owen, was found to be made up from the remains of two or three megatheria. Skilfully re-arranged, it now stands in the British Museum—still, perhaps, the largest representative of the osseous structure of these stupendous organisms—the length of the skeleton, even now, being twenty feet. The tusks are restored to their usual position in the skull of the mastodon. One or two interesting papers have been read on these remains, at the meetings of the Geological Society; but whether the evidence given by Mr. Koch, of the contemporaneity of the living megatherium with man was then explained away, the author has not ascertained.

120 feet long, which stopped the whole army of Regulus on the banks of an African river, until killed by the military engines. Pliny, confirming the story, declares that its skin and jaws remained in the Capitol till the Numantine war, a period of 120 or 130 years. He also relates that a python was exhibited in Rome, in the days of Claudius, 50 cubits long. Now, a sea serpent, if ever authenticated and measured, will be found probably not to exceed these dimensions.

The rapid increase of mankind, the subjection of the animal creation to his uses, and the progressive destruction of all the races that may be offensive to his interests or threatening to his safety, account sufficiently for the diminution in the size of these monster reptiles, without the necessity of supposing the foregoing instances to have been the lingering survivors of species now extinct, though this is feasible. But these causes need not apply to the generations of mighty creatures whose home is in the ocean depths. We have spoken of the superior size of the oceanic fishes, and of the effects of heat in developing structure. There is yet another circumstance peculiar to some classes of fishes, which also influences their size, their longevity, and the generally admitted fact that the cartilaginous kinds at least continue to grow as long as they live. Some naturalists have estimated the natural duration of the life of the whale at 1000 years, which is not likely, being one of the mammalia. It is to the true fishes that the remark rather applies. We have not many data for judging accurately of the longevity of fish, but such as we possess do lead to the conviction that it is in this division of organized nature we must seek the patriarchs of creation, only to be surpassed by the wonders of the vegetable world. It is confirmatory of the doctrine of the continuous growth of many of the cartilaginous fishes, that in this class we find the greatest increase of individual size. Those of osseous structure may also partake of this effect of longevity, as they certainly do, of the forcing power of high temperature. Of the stimulant effect of warmth on the growth of fish, as well as longevity, a few illustrations may be interesting.

The herrings, taken collectively, says Swainson, are a small fish, few exceeding in size that which is so well known on our own coasts; yet they have been found in the tropical seas to attain the gigantic length of ten or twelve feet. The eels of Surinam are found 15 or 16 feet long. The largest cod caught on our shores weigh 60 or 70 lbs. In the Pacific they increase to 100 lbs. The pike is notoriously long-lived, and in individual instances attains most extraordinary dimensions. Some doubt is thrown on Gesner's account of the one said to have inhabited Heilbrun lake 250 years, yet he assures us its skeleton, 19 feet long, was long preserved as

a curiosity at Manheim. The sharks (cartilaginous) are met with in most latitudes, but the largest of the destructive species are those of the tropical seas.

But perhaps the most remarkable of the cartilaginous families are the rays. The species on our coasts, such as the skate, have been known in individuals to attain a weight of 200 lbs.; but the pterocephali, which are entirely pelagic and *very rarely seen*, inhabit the tropical seas, and become so gigantic as to give rise to a suspicion that their appearance may be one of the phenomena on which the belief in the kraken has been based. In 1845, the captain of a vessel trading to Africa, informed the author, that on his preceding voyage, while lying at Fernando Po, he saw from the deck of his vessel, at a distance out at sea, several large fish of singular appearance; going in pursuit of them with two canoes, manned with some of the ship's crew and negroes, he came up with, and struck one with a harpoon, whereupon the creature set off with surprising velocity, swimming near the surface, and towed the canoes a distance of three miles before they succeeded in killing it. On getting it on shore it was found to measure 15 feet by 9; and though the smallest of the schole, its weight was so great that all hands could scarcely haul it on the beach. From the description given by the captain, there was no difficulty in identifying his prize as an eagle ray. One of these creatures is stated to have been taken near Guadaloupe, 25 feet in expanse from extreme of one fin to the other across the body, and 14 feet from the snout to the tail, and it required seven yoke of oxen to drag it on shore. A schole of such creatures, seen from a distance through the mirage of a tropical sun, might, to a lively imagination, realize some parts of the description given of the appearance of the kraken.

We also find the mollusca to increase wonderfully in size under the influence of warmth, and protected by deep water. Contrast, for instance, the Polynesian clam with the European oyster—the medusæ of the narrow seas with those of the Pacific, five feet in diameter. The same remark will apply to other species as the asteridæ.

But there is an order of this class (mollusca) which is suspected to furnish, if not the solution of one branch of the present inquiry, at least a species that may fairly come within the category of sea monsters.

This is the cephalopoda, a form of animal life so strange, linked indeed to other creatures by properties in common, yet possessing an organization so eccentric, and exercising its functions in so peculiar a manner, that in its contemplation analogy fails us, and we are tempted to believe that it is offered to our view as an intimation of a new series of

forms existing in the submarine world hitherto unthought of. To continue the description in the language of Beale, "These creatures—endowed with hearing, seeing, touch, smell, and taste—are second to no inhabitant of the waters in the complex structure of their organs. Besides these senses, they possess the remarkable power of adhesion to the surfaces of bodies by means of the acetabula or suckers which line the inner surface of their tentacula. In addition to all this, the sepia possess the rudiments of fins, which in the sepia octopus are elongated beyond the length of the body, terminating in a thick cylindrical portion covered with numerous suckers, and in some cases with a row of sharp claws added. By means of these the animals can fix themselves, as by anchors, firmly to rocks during the agitation of the waters. Their eyes are phosphoric, they are amphibious; they swim with their heads behind, and walk with it downwards." They are of all sizes, from the microscopic form to those enormous dimensions which more particularly entitle them to this notice. Pliny spoke of the colossal cuttle fish as polypi; he described them as having bodies as large as a barrel, and as infesting the artificial fish-reservoirs on the coast of Sicily. His account is confirmed by modern naturalists. Swainson saw specimens on the coast of Sicily, whose tentacula at the base were as thick as a man's leg; and we shudder while reading Sir Grenville Temple's narrative of the dreadful death of a Sardinian captain at Jerbeh, who perished in the horrid embraces of one of these monsters, while bathing, and was found drowned in four feet water, his limbs strongly bound together by its tentacula. These are the creatures so dreaded by the Polynesian divers for shells; and though the multitudes which are found about the shores of the Southern seas do not exceed greatly our own specimens, there are strong grounds for believing that, in the depths of the great ocean, this race realize the proverbial saying of fishermen, "that the cuttle fish is the largest fish that swims in the sea."

Denis Montfort, an old writer on the mollusca (but whose work we have not met with), mentions several instances of the appearance of this colossus of the deep, and gives at length the story referred to by Sir J. Jardine in his chapter on the Kraken in the Naturalists' Library. This account also appears in full in an article on the sea serpent in the second or third bound volume of *Blackwood's Magazine*, and the catastrophe is related with the circumstantiality of truth. The circumstances are briefly as follows:—Dens (the name of the navigator), being becalmed off the coast of Africa, availed himself of the opportunity to have the sides of his vessel scraped; and while his crew were thus engaged, this monster of the

PLATE 2

1. The Whale of Havre, increased to 35 feet.
2. Ornycoteuthis Banskii, from Cook's voyages, and from fragments found in mouth of Spermaceti Whale, as mentioned by Beale.
3. Pteroceephalus, or Eagle Ray, from actual admeasurement.

deep emerged from the surface, and swept off two of their number, itself losing one of its tentacula by the blow of an axe. Beale, the writer on the sperm whale, relates a struggle he had with a cuttle fish of ordinary size, which he found on the shore of one of the Pacific islands, and which fastened on his arm. He describes these creatures as possessing the power of projecting themselves through the air 80 to 100 feet, by the rapid rotatory motion of their tentacula. He also mentions being startled one day by seeing a sepia octopus rising rapidly to the surface, using its long arms with a spiral motion. A specimen of this species was found dead in the Pacific, and described by Drs. Solander and Banks on Cook's first voyage; its body was 6 feet long, and flocks of birds were feeding on it. Part of the remains were brought home, and deposited in the Museum of the College of Surgeons. Beale considers that the spermaceti whale feeds on the cephalopods, descending to great depths for that purpose. On one occasion, after the capture of a cachalot, an enormous limb or tentaculum of a cuttle fish was found in its mouth, and though partly corroded, was 27 feet long.

Having considered briefly the more prominent arguments and analogies which bear directly or indirectly on the question of sea monsters, we hasten in the ensuing sections to examine the evidence on which their actual existence is asserted.

SECTION III.

THE KRAKEN.

Ancient Superstitions—Pontoppidan's Account—Probable Explanation by Refraction—Modern Accounts and Inquiries—Possible Class of Animals—Echinodermata—No such Creature as Pontoppidan's Kraken—Strange Appearance in the Atlantic—Examination of that Account—Probable Association of Vigia with Sea Monsters.

"Monstrum, horrendum, informe, ingens, cui lumen ademptum."

"There Leviathan,
Hugest of living creatures, on the deep,
Stretch'd like a promontory, sleeps or swims,
And seems a moving land."

Milton.

The term kraken, though probably of Scandinavian origin, seems to spring from a similar root as the old German word "*krabben*," to crawl, (whence "crab,") and may be translated as ground-laying or crawling.

The existence of the creature so called, we find first pointed at by Pliny; who briefly states, that there is a submarine tree growing in one of the straits at Cadiz, of such vast size and extent of branches, that, as it is believed, the channel cannot be entered. Allusions to some monstrous amorphous inhabitant of the sea, may also be met with in the mythic histories of the early Scandinavian races; but the first and only account possessing any claim to the attention of science, is derived from the writings of the celebrated Norwegian bishop, Pontoppidan. As his description is, as it were, a text for all discussions on the kraken, it is only right to give it here. "Our fishermen usually affirm," says the bishop, "that when they have rowed out several miles to sea, particularly in hot summer days, they are informed, by various circumstances, that the kraken is at the bottom. At such times they generally find the greatest quantity of fish, especially cod and ling: and instead of the depth of water being 80 or 100 fathoms, as expected, they sound only 20 or 30. Knowing that it is the presence of the kraken which causes these unnatural shallows, they carefully observe whether the water becomes shallower. If this be the case,

they find that the kraken is raising himself nearer the surface, and that it is no time for them to stay longer: leaving off fishing, therefore, they take to their oars, and pull away until they come to the usual soundings; then resting, in a few minutes they see the enormous monster come to the surface. He then shows himself sufficiently, though his whole body does not appear, which in all likelihood, no human eye ever beheld. Its back, which seems one and a-half English miles in circumference, looks at first like a number of small islands, surrounded by something like sea-weed. Here and there, a large rising is observed, like sand-banks, on which various kinds of small fish are seen continually leaping about. At last, several bright horns or points appear, which grow thicker and thicker the higher they rise, and sometimes stand up as large as the masts of middle-sized vessels; these are the creature's arms, and, it is said, if they were to lay hold of the largest man-of-war, they would pull it down to the bottom. After this monster has been on the surface a short time, it begins slowly to sink again, and then the danger is as great as before, because the motion of his sinking causes such a swell in the sea, and such an eddy or whirlpool, that it draws every thing down with it. Besides these arms," continues Pontoppidan, "the Great Creator has also given this animal a strong and peculiar scent, which it can emit at certain times, and by means of which it beguiles and draws other fish to come in heaps about it. During many months the kraken is continually employed in eating; during many others, in carrying on the last process which succeeds digestion; and this operation is so peculiarly agreeable to the smell and taste of other fishes, that they gather together from all parts, and keep, for that purpose, directly over the kraken, who then opening his arms, seizes and swallows them." In the minuteness of this description, the good bishop's informant, (for I presume he received it from another) if he does lie, "lies like truth."

Pontoppidan thinks that the accounts of floating islands, occasionally seen about the coasts of Norway, and off the Sound of Sweden, in the Baltic, are referable to the appearance of this prodigy. The belief in the existence of the kraken seems to have been pretty general among the Norwegian sailors and fishermen in the bishop's time, (17th century,) and may still linger with them. That of the sea serpent certainly does, and the two creatures are often confounded, though there cannot possibly be a greater distinction between the two, except, perhaps, between such objects as Mont Blanc and the Rhone.

It is most likely that much which is true of the alleged appearances of this huge monster, may be referred to the effects of refraction, which, as every one accustomed to the sea well knows, is capable of producing

the most singular optical illusions. Seen through the mirage, on a calm day, distant vessels are brought near, are elongated, depressed, raised in the air, divided, and, in some rare instances, reflected on an opposite stratum of air, on the other side of the beholder. Land too distant to be seen, according to the laws of perspective and the earth's figure, is brought up from below the horizon to the surface, and sometimes appears above it in an inverted position, and all this without any visible change in the atmospheric medium itself; so that it is only by the effects themselves that the unusual refracting condition of the air is recognised. Fish spawn, or an unusual assemblage of medusæ, seen at some distance, occasionally discolour the water so as to produce the appearance of a sand-bank, in a quarter where none is known to exist.* With regard to the change in the soundings, reported by the fishermen, it is possible some such phenomenon may have been caused by submarine volcanic eruptions, similar to those in our own time, occurring in the Mediterranean, and off the Western islands. These are known to be accompanied, also, by the rising to the surface of quantities of ashes, and the lighter portions of the ejected matter. In this twofold effect of an eruption taking place at the bottom of the sea, we can realize many of the circumstances associated with the appearance of the kraken; and it is no wonder, that events so rare, and attended by such new phenomena, to the imaginations of the sea-faring men of the 17th century, already impregnated with all kinds of sea marvels and diablerie, should have presented the terrible conviction of the present existence of some portentous monster of the deep.

We have not met with any recorded appearance of *Pontoppidan's* kraken since his own days, except one referred to in the second volume of Transactions of the Royal Society of Edinburgh. It purports that in the year 1786, certain appearances off the east coast of Scotland were thought to betoken the presence of this creature; but from all the particulars which have been preserved, they may be satisfactorily believed to have been optical phenomena.

It is usual for naturalists to retire from the further consideration of this

* A few years ago, a vessel sailing two or three hundred miles to the westward of Africa, fell in with a sand-bank, raised apparently some feet above the surface of the sea. As nothing of the kind was laid down in his chart, the captain very properly sent a boat to examine it. Contrary to all experience of mirage, the bank did not disappear as the boat approached, but became more and more defined, until she fairly ran on to it, when it was found to be a bank, not of sand indeed, but of dead locusts, laying so thick that it projected several inches above the surface, the sea being calm at the time. The account was read from a letter written by a person on board the ship, before a society, the author of these pages being present, who now narrates it from memory.

creature, by associating it, divested of exaggeration, with the colossal cuttle fish, whose reality, within certain dimensions, is established; and the only tangible circumstance on record, which may justify the claim of the kraken to remain in the category of natural history, even as an "open question," does certainly strengthen this conclusion. It is also given on the authority of Pontoppidan, who received the information from the Rev. M. Freis, minister of Bodsen "that in the year 1680, a kraken, perhaps a young and careless one, came into the water that runs between the rocks and cliffs in the parish of Alstabourg. It happened that *its extended long arms or antennæ*, which this creature *seems to use like a snail*, caught hold of some trees standing near the water, which might have been easily torn up by the roots; but besides this, as it was found afterwards, he entangled himself in some openings or clefts in the rock, and therein stuck so fast, and hung so unfortunately that he could not work himself out, but perished, and putrified on the spot. The carcass, which was a long time decaying, and filled most part of the narrow channel, made it almost impassable by its intolerable stench."

In the chapter on the kraken in the Naturalists' Library, it is stated (authority not given), that about seventy years ago, the remains of a dead kraken were found driven to the mouth of a large cave in the island of Meikle Roe.

Like the good bishop Pontoppidan, we must all lament that these rare opportunities for solving doubt were not availed of. I would add a remark, that it is very probably consonant with the habits of the cuttle fish for them to project their tentacula above the surface of the water; but however vast we may imagine one of these creatures to become, still the phenomena of its appearance at the surface would not correspond with the accounts of the old Norwegian kraken.

The tentacula of a cuttle fish would be projected above the surface round a common centre, and no part would be seen beyond or outside the arms, unless the creature rose to the top horizontally, in which case the tentacula would not be vertical "like the masts of a ship," as Pontoppidan says. The only known animal form which magnified to a kraken would accurately conform to the circumstances of its legendary appearance, is to be found probably among the echinodermata; as, for instance, the star fish. These animals are found in very large size (and rare in proportion to their size), and singular appearance, in the Norwegian and Shetland seas, as much as two feet across the body and rays. The rays of this family are divided and subdivided towards the extremities, so as to present at a distance a disk-like appearance, and the whole surface of the

side on which the mouth is situated, is covered with rows of retractile spines, which serve the office of feet when the animal is at the bottom. But if we imagine an individual of this genus, grown to the fabulous size of the kraken, and rising to the surface with its mouth uppermost, then indeed its tentacula would present the aspect of a forest rising up from the sea, and its huge bulk, even when below the waters, might well puzzle the fishermen in their soundings.

However, we may confidently assert, there is not the least vestige in our days of Pontoppidan's kraken. The west coast of Norway, between the Naze and North Cape, may not be more, or even so much frequented by shipping as in the days of the Vikings, for our Archangel traders rarely approach it; but on the other hand, a remarkable phenomenon observed in any part of the civilized world, is soon promulgated and made known, and the well-supported declarations of unlettered fishermen, even on such a subject as the kraken, would meet with due attention by men of science. Mitford, an intelligent traveller in Norway and Lapland in 1841, made special inquiries about the Norwegian sea monsters. Of what he gathered anent the sea serpent, we will speak presently, but of the kraken he says, "I searched for it *in vain*, both on the coast and in the fish market at Bergen."

Before entirely taking leave of the kraken, however, some notice must be taken of the following very remarkable communication made to the Magazine of Zoology and Botany, in the year 1834.

"Upon the 22nd June, in lat. 46° 57′ N., long. 58° 39′ W., Captain Neill, of the ship "Robertson" of Greenock, then homeward bound from Montreal to Greenock, saw the head and snout of a great sea monster, of which a sketch was drawn at the time (See plate.) It was first observed at about a quarter past nine A.M., on the weather-bow, about four points, and it then appeared like a large vessel lying on her beam-ends. The "Robertson" was hauled up so as to near it, and running at the rate of eight knots an hour, she, at noon, got abreast of it, distant about a mile to leeward. On observation at this time, it was discovered to be the head and snout of a great fish swimming to windward; and though an attempt was made to get closer, it could not be accomplished, because the fish, without much apparent exertion, kept swimming as fast as the vessel sailed. Immediately above the water its eye was seen like a large deep hole. That part of the head which was above the water, measured about twelve feet, and its breadth or width twenty-five feet. The snout or trunk was about fifty feet long, and the sea occasionally rippled over one part, leaving

other parts quite dry and uncovered. The colour of the part seen was green, with a light and dark shade, and the skin was ribbed."

Supposing this most extraordinary account to be true—and it is presumed that it would not have been admitted into a scientific journal without some authentication—the circumstances are entirely consistent with each other, and lead forcibly to the conclusion that the crew of this vessel did really witness the rare sight of some vast pelagic monster, *"natans" in gurgite vasto.* The object was first seen four points on the bow, and it took the vessel two hours and three quarters at eight miles an hour (equal to twenty-two miles) to change its bearing four points, and get abreast of it. Supposing the estimated size to be an approximation, the object when first seen must have been at furthest six or seven miles off, and was therefore swimming two-thirds as fast as the vessel sailed. This change of position precludes the possibility of refractive phenomena, or of the object seen having been the hull of a vessel, or a dead whale; and the absence of blowing disfavours the idea of a living cetaceous creature. The colour, the ribbed appearance, and the general form as shown in the sketch, do not oppose the supposition that this monstrous being belonged to the cephalopoda, which are known to swim rapidly, the tentacula at such time being below the surface.

Something of a similar appearance is mentioned by Dr. Hibbert, as having been seen at a distance from the shore of the island of Barra. "It seemed," according to the declaration of witnesses taken on affidavit, "like the hull of a large vessel, but on approaching it nearer, they saw it was infinitely larger, and resembled the back of a monster."

It is in reading these strange accounts that the idea of a connection between the mysterious vigia of the Atlantic, and the half-revealed creatures of its depths is suggested. There is a strange similarity between some of the recorded instances of supposed rocks in mid-ocean, and such stories as the above.

Thus we have the ship "Indemnity," in 1829, when on her way to Demerara, in lat. 43° 20′ N., long. 25° 10′ W., discovering a rock distant about three ship's lengths—the ship going two and a half knots an hour, with a heavy N.W. swell. With each succeeding swell the rock was entirely covered, but at intervals it showed several feet above the water, and was perfectly perpendicular. From the mast head it was seen a great depth below the water, and appeared to be in the shape of a cone.

Again, Captain Livingston says Gough's rocks were seen in lat. 40° 28′ N., long. 30° W.; one of them twelve and the other three feet above the water. The Devil's Rocks, about lat. 46° 35′ N., long. 13° 7′ W., are

recorded to have been seen several times, and are described as cone-shape also, appearing now above and now two or three feet below the surface.

Many observant navigators dwell much on the remarkable changes in the colour of the waters of the ocean, irrespective of clouds or sky. In the deep sea, the natural colour of the water is dark blue, but occasional spots of bright green are passed over; and it has been noticed in these localities, the medusæ are remarkably large, even three to five feet in diameter, and of great variety in colour and shape.

Whether these vigia of cone-like shape just level with the surface, "unsought for, seen; when pursued, never found," occasionally reported by seamen, be altogether illusions, or whether they be some amorphous monster, like Milton's,

> "————other shape,
> If shape it might be called that shape had none
> Distinguishable in member, joint, or limb;"

just emerging for a brief space out of the abyss and again settling down silently to its proper habitation; or whether they be indeed perils of the sea, on which the freighted bark, careering before the gale, strikes and founders, leaving no other record of her fate than what is implied in the ominous and pregnant epithet, "a missing ship"—who can tell? We undertake not to decide, but certes Capt. Neill's monster is the strangest of all the strange visitants from beneath.

PLATE 3.

1. The Stronsa Animal, from the reported admeasurements, 55 feet.
2. The appearance reported by Captain Neill.
3. Colossal Cuttle Fish, from actual admeasurement of fragments.

SECTION IV.

THE SEA SERPENT.

Mythological and Legendary Tales—Modern Evidence becomes more Definite—Hans Egede's Account—Pontoppidan's—The American Accounts—Professor Silliman's—Norwegian Accounts of the Present Day—Result of Inquiries by British Travellers—The Instance off the Hebrides in 1809—The Stronsa Animal—Evidence Examined—Speculation on the Class of this Animal.

"And yon immense
Serpent, which rears his dripping mane and vasty
Head ten times higher than the haughtiest cedar
Forth from the abyss."

Cain.

We now come to the sea serpent. Passing by the monstrous tales of huge ophidians, which are more or less mixed up with the mythology of all ancient nations, and the legendary dragon, whose reality retained firm hold of European belief until comparatively a late period, we trace the first reports of a huge creature of serpentiform shape, and inhabiting the sea to the shores of Norway (like the kraken), where from the earliest periods mention is made of its appearance.

This much may be premised in favour of the old belief being based on truth; that whereas in the case of the kraken, as described by Pontoppidan, the dragon, and other fabulous creatures, the instances of their alleged appearances have become more and more rare as we draw near our own times, the reverse has been the case with respect of the sea serpent. Here we have, first, vague and exaggerated accounts, mixed up with the legendary superstitions common to the old times; as, for instance, that this animal inhabited the deep Scandinavian lakes—that it infested the sea coasts, lurking in the hollows of the rocks; and, coming out at night, ravaged the country of its cattle, &c., thus assimilating its character to that of the old dragon which in other countries was a land monster, but here a marine one. Then, since the days of Pontoppidan we have occasional reports of the sea serpent, evidently much exaggerated, but at least

confined to the element in which alone so monstrous a form could continue unexposed to the observation of man; and now within the last 50 or 60 years, when no accounts are received except at their true value, we have more frequent instances of its appearance, all agreeing in their general detail of circumstances; and lastly, we have one, if not two cases of dead animals having been found, which correspond remarkably in many particulars with the supposed sea serpent; though unfortunately in the most important one the carcass was cast ashore in a place too remote for its careful examination by qualified persons before natural decay and the action of the sea had mutilated it.

It is not probable that all the appearances recorded of late years (granting their authenticity) have been those of the same creature or class; some of them may doubtless be properly assigned to the cetaceous families, of which it is confessed by the best zoologists, we have but a very inaccurate knowledge; and others may fairly be considered as the accidental visits of sharks or other large fish, rare in the latitudes where seen, and which, under peculiar circumstances and to excited imaginations, have given the idea of nondescript monsters.

In order that our readers may be enabled the better to judge of the true nature of modern testimony, it will be necessary to quote one or two of the earlier descriptions of the sea serpent, after which we propose scrupulously to limit our instances to those which, authenticated by names and dates, give strong and reasonable grounds for believing that the creatures seen were really those whose verification is among the desiderata of natural history.

Hans Egede, the well-known Danish missionary to the coast of Greenland in the early part of last century, after adverting generally to sea monsters, and describing several, goes on to say :—" But none of them have been seen by us, or any of our time that ever I could hear, save that most dreadful monster that showed itself upon the surface of the water in the year 1734, off our new colony, in 64° N. This monster was of so huge a size, that coming out of the water, its head reached as high as the mast-head, its body was as bulky as the ship, and three or four times as long; it had a long pointed snout and shoulders like a whale fish, great broad paws, and the body seemed covered with shell-work, its skin very rugged and uneven. The under part of its body was shaped like an enormous huge serpent, and when it dived again under water, it plunged backwards into the sea and so raised its tail aloft, which seemed a whole ship's length distant from the bulkiest part of its body."

Pontoppidan, the Norwegian bishop, speaks at large of the sea serpent

as well known to frequent the inlets and fiords of his country, and of the universal belief in its reality. He cites several instances, but which being generally familiar to persons taking interest in the subject, it would be tedious to extract; suffice it to say, his descriptions may be summed up thus: "Though difficult to ascertain its exact dimensions, all who have seen it are unanimous in affirming that it appears about 600 feet long, that it lies in the water in many folds, and these appear like so many hogsheads floating in a line at a considerable distance from each other." Thus much for the other account of this animal. Its alleged appearances during the present century are *comparatively* numerous, and nearly all on the North American eastern coasts, or the western ones of Norway.

Among the American instances we have the report published by the Linnæan Society of New England, from which we learn that the sea serpent was seen several times during the month of August, 1817, by many persons off the harbour of Gloucester, 30 miles from Boston; and their affidavits were carefully collected by the society, through General Humphreys, who transmitted them to the late Sir Joseph Banks: one of the eye-witnesses and deponents being a member of the committee of the Linnæan Society, and another a clergyman. The result of this testimony is, that the animal was of great length, estimates varying from 80 to 120 feet, of serpentiform shape, moving through the water with great rapidity, displaying the characteristic protuberances on the surface, the head comparatively small, resembling a horse's, and the colour dark. One of the deponents fired a ball at it, at the distance of only 30 feet. Neither mane, gills, fins, nor blow-holes are mentioned. It was seen only in calm settled weather.

In August 1819, the same creature, or one of the same species, was seen off Nahant, Boston, during four weeks, by numerous persons; the folds or protuberances were again remarked, also the frequent elevation of the head out of the water. The eye was noted as remarkably brilliant and glistening; the motion of the body undulatory, making curves perpendicular to the surface, and giving the appearance of a long moving string of corks; the water was smooth, and weather calm and serene. Another notice appears in 1833 of the sea serpent having been seen in that year also off Nahant, by 40 or 50 persons at a time.

The last instance we have met with of its appearance on the American coasts, is contained in Silliman's *Journal of Science* for 1835. It is to the effect that the captain and crew of an American brig, on her passage from Boston to New Orleans, in March or April of that year, when nine or ten miles off Race Point lighthouse, distinctly saw the sea serpent, near

enough to be visible to the naked eye. The creature raised its head (the size of a barrel) 7 or 8 feet above the surface, and had the appearance of a mane on its neck; it was very long; its motion in the water resembled that of a snake; and every time it put its head out of the water, it made a noise similar to the blowing off of steam. One of the crew had seen the animal which appeared off Nahant two years before, and declared this to be the same.

In the same volume of Silliman's journal is the following letter addressed to Professor Silliman:—

"Boston, April 5, 1835.

"Dear Sir,—On my passage from the River Plata to this country in January 1834, being in lat. 34½° S. and long. 48° W., I saw what at first was supposed to be a fish called an albacore; but on further examination it was discovered to be a serpent, of which I cannot give a clearer description than to say that a common dark-coloured land snake is in miniature a perfect representation. A light breeze prevailed at the time, and the sea was quite smooth. It first appeared within ten feet of the vessel; its head was perhaps two feet above the water, and appeared as large as a ten gallon keg; the eye was distinctly seen. The whole length of the serpent was about half the length of the vessel, say forty feet. The size and circumference of the body was nearly as large as a barrel. Nothing like a fin was seen. I could not make out the distinct appearance of the tail. The serpent remained almost motionless while in sight, the head above the water, and eyes directed towards the vessel."

On this communication the editor makes the following remarks:—

"The distance of the place of observation being several hundred miles from the nearest coast, this serpent must have been a denizen of the ocean; for the huge land-snake of South America could not navigate so far out to sea, if indeed they ever take the ocean at all. The snake was perfectly quiet, and appeared quite comfortable and at home on the waves. We must therefore consider this case as settling the question of the real existence of a sea serpent. The absence of paddles or arms forbids us from supposing that this was a swimming saurian." The editor also vouches for the integrity and honour of his correspondent, with whom he had been long acquainted, and who had travelled extensively and traversed the sea in many climates.

Such are the American accounts, and all these appearances took place

during calm and bright weather. As one of the two instances of the supposed animal itself having been found, occurred in connection with the earliest of the above-recorded appearances, it is copied here from the Naturalists' Library:—

"The Boston Society of Natural History has the merit of having first brought this serpent under the notice of zoologists; and the committee who described it, unhesitatingly regarded it as a specimen of one of the young of the great sea serpent. It was seen and killed in September 1817, near Sandy Bay, between a salt lake and the sea, at no great distance from the shore, and was speedily brought to Boston for the examination of the society. It was a yard long all but half an inch. The contour of the back exhibited its most singular feature, for here was found a waving line, produced by a series of permanent risings, which commenced near the head, and extended, almost without interruption, to the tail, their total number being 40. The body could be bent with the greatest facility in the vertical direction, especially at the undulations, but not without great difficulty laterally. The society applied to this animal the name of scoliophis atlanticus."*

The records of the sea serpent's appearance off the coasts of Norway during the present century, will now be presented in an abridged form:—

The fishermen of Segerstad told Sir Arthur de Capell Brooke that it was seen in 1818 in Folden Fiord. In July, 1819, Captain Schilderness assured Sir Arthur that it made its appearance at Otersun, being seen almost daily during the whole month, and continued while *the warm weather lasted.* When he (Captain S.) first saw it, he was in a boat distant 200 yards, and supposes the length to have been 600 feet. The bishop of Nordland had seen two of them about eight miles from Drontheim, being not far from them, and considered the largest to be about 100 feet.

In 1822, one, in bulk like an ox, and very long, made its appearance off the island Sorœ, near Finmark, and was seen by many islanders.

The last account was published in the newspapers of Drontheim, having been communicated to the editor by an enlightened and credible man. He asserted that since the beginning of the dog days the serpent had been

* A representation of this scoliophis atlanticus, with drawings of several of its parts, appeared in the *London Illustrated News* of October 28, 1848.

seen on various parts of the coast, especially near Storforen, at the Kergvang island. The fishermen had been greatly alarmed, and in their terror guessed the creature's length at 600 to 800 ells, for when people were near its head they could not see its tail; the greatest thickness was near the head.

Mr. Mitford, who travelled in Norway in 1841, had his curiosity excited by the reports of the sea serpent; and, though disbelieving its existence himself, remarks that two seafaring men had lately deponed on oath to having seen it six miles from Molde. It held its head like that of a horse, two feet above the water—was of a grayish colour, mouth black, very large black eyes, and whitish mane that hung down from its neck to the water; they saw seven or eight folds about a fathom apart; and as far as they could judge at a distance, estimated its length at 600 feet. Mitford adds a note, to say that, since the publication of his travels, he had received a letter from an intelligent friend at Bergen, of which the following is an extract:—"I have consulted a gentleman of much learning and intimate knowledge of every thing belonging to Norway, Stifftamtamund Christie, whose name is so much connected with the political institutions of Norway since 1814. I especially asked his opinion about the sea serpent, and he assured me that not only do the peasants feel certain of its existence, but that he himself believes it—that the bishop of Bergen, a few years ago published an article in an antiquarian paper, which comes out occasionally, edited by the directors of the Bergen museum, containing information corroborative of this belief: that the inhabitants of the island Herroe at Sandmör, see the serpent every year for a couple of months in summer, whenever the weather is fine and the sea calm."

Such are the Norwegian testimonies, agreeing with the American descriptions in some things, especially in the appearances taking place only in calm, fine, and warm weather; in other points they differ, and upon the whole seem to refer to an animal of larger size and less ophidian in its characters. The facts gathered from the shores of the British isles are few but important. Dr. Hibbert declares that the great sea serpent has occasionally been recognised in the Shetland seas, and specifies one which was seen off Stromness.

The most authentic statement is that by the Rev. Mr. M'Clean, parish minister of Eigg, one of the Western islands, and addressed by him to the secretary of the Wernerian Society, dated 1809:—

"I saw the animal of which you inquire in June 1808, on the coast of

Coll. Rowing along that coast, I observed, at about the distance of half a mile, an object to windward which gradually excited astonishment. At first view it appeared like a small rock; but knowing that there was no rock in that situation, I fixed my eyes closely upon it, then I saw it elevated considerably above the level of the sea, and after a slow movement, distinctly perceived one of its eyes. Alarmed at the unusual appearance and magnitude of the animal, I steered so as to be at no great distance from the shore. When nearly in a line between it and the shore, the monster, directing its head, which still continued above water, towards us, plunged violently under water. Certain that he was in chase of us, we plied hard to get ashore. Just as we leapt out on a rock, and had taken a station as high as we conveniently could, we saw it coming rapidly under water towards the stern of our boat. When within a few yards of it, finding the water shallow, it raised its monstrous head above water, and by a winding course, got, with apparent difficulty, clear of the creek where our boat lay, and where the monster seemed in danger of being embayed. It continued to move off with its head above water, and with the wind, for about half a mile, before we lost sight of it. Its head was somewhat broad, and of somewhat oval form; its neck somewhat smaller; its shoulders, if I can so term them, considerably broader, and thence it tapered towards the tail, which last it kept pretty low in the water, so that a view of it could not be taken so distinctly as I wished. It had no fins that I could perceive, and seemed to me to move progressively by *undulation* up and down. Its length I believe to be between 70 and 80 feet. When nearest to me it did not raise its head wholly above water, so that the neck being under water, I could perceive no shining filaments thereon, if it had any; its progressive motion under water I took to be very rapid. About the time I saw it, it was seen near the Isle of Canna. The crews of thirteen fishing boats were so much terrified at its appearance that they in a body fled from it to the nearest creek for safety. On the passage from Rum to Canna, the crew of one boat saw it coming towards them with the wind, and its head high above water. One of the crew pronounced the head as large as a little boat, and its eye as large as a plate. The men were much terrified, but the monster offered them no molestation."

Mr. M'Clean saw this in June 1808, and it is remarkable that the celebrated Orkney animal of the Wernerian Transactions, generally corresponding to the foregoing account, was cast ashore dead on Stronsa in October of the same year. This is the second instance of the supposed

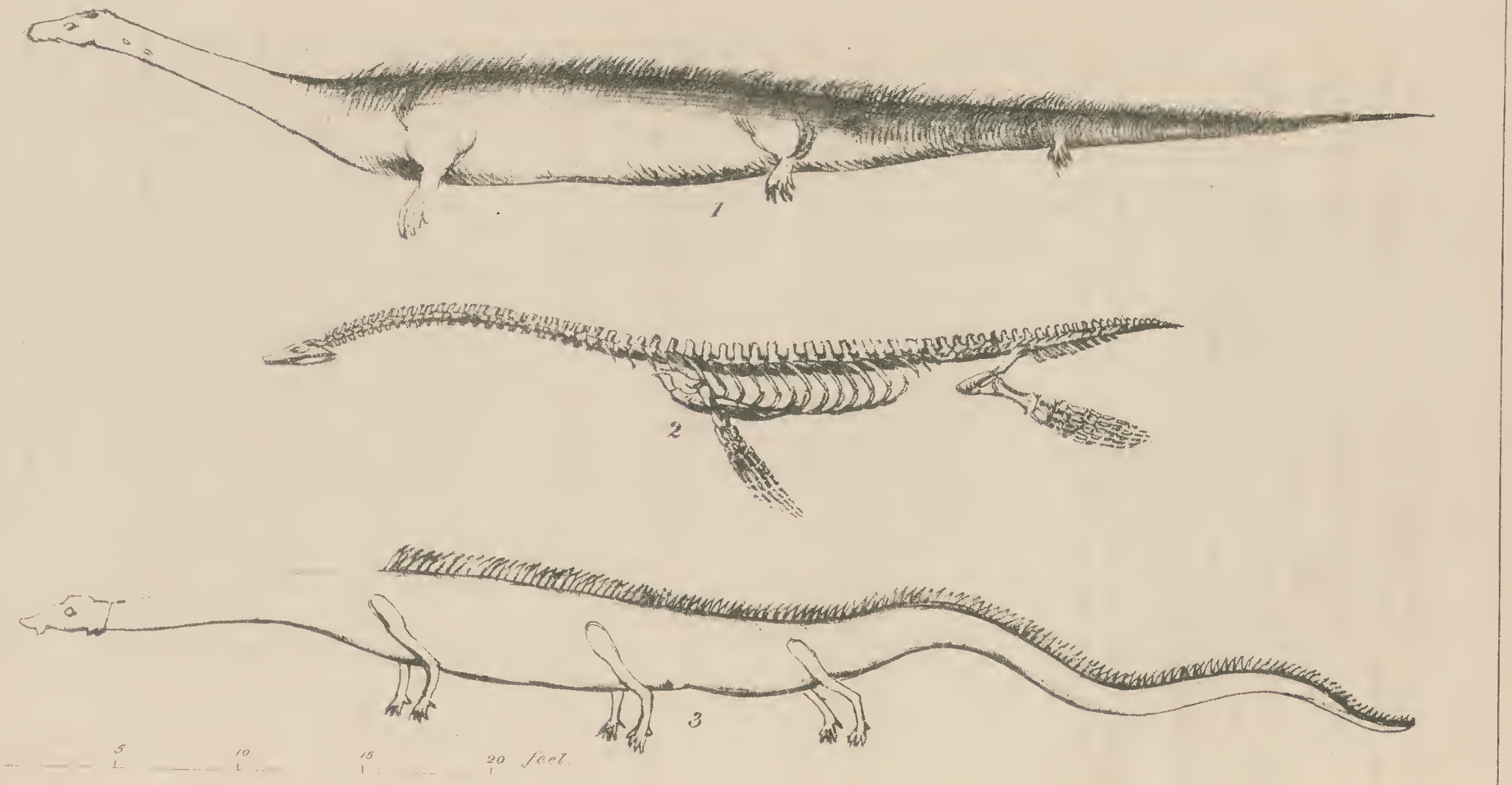
actual animal having been found; and as it has given occasion to much controversy, no apology is required for taking the particulars at some length from the Transactions of the Wernerian Society, which are probably not easily accessible to the generality of readers.

This is the subject of Dr. Barclay's papers, and of the controversy between him and Sir Everard Home. The idea does not appear to have struck Dr. Barclay that the dead animal was identical with the one seen alive by Mr. M'Clean three or four months before; but making allowance for the short and imperfect opportunity which the latter gentleman had for forming his estimates, there remain sufficient grounds for a reasonable supposition that these two animals were the same.

A brief enumeration of the leading characteristics of the living creature, given by Mr. M'Clean, placed in juxtaposition with those of the Stronsa carcass, as derived from the affidavits of eye-witnesses, will enable the reader to form his own judgment:—

THE LIVING ANIMAL.	THE DEAD ANIMAL, *Taken from four descriptions on affidavit by eye-witnesses.*
Head, when elevated out of the water, broad and of oval form.	Bones of lower jaw like a dog's; the appearance of soft teeth, which could be bent; no teeth in upper jaw. Throat too narrow to admit the hand, says one witness; wide enough to admit the foot, says another.
Neck smaller; shoulders considerably broader; body tapering towards the tail, which was kept low in the water.	Length of neck to shoulder, 10 feet 3 inches; middle of head to mane, 15 feet; ridge of back to belly, 4 feet; circumference, 10 feet, rather oval than round; extremity of the tail 2 inches thick, and rather rounded, and quite flexible any way.
No fin seen.	Had six fins or paws, those next the head 4½ feet long; the toes 8 inches—not webbed except for 1½ inches, but fringed with bristles 10 inches long; the other fins or paddles not so long.
Head being under water when nearest, no mane was seen.	Had a mane from shoulders to near the extremity of the tail; bristles whereof from 2 to 10 inches long.
Motion undulating up and down, and very rapid when the animal was wholly under water; less so when head above the surface.	Two canals, one above and another below the back bone, from neck to tail, containing two ligaments, strong enough to raise the animal up or bend its body in a spiral form; bones of a gristly nature, except back bone.
Colour not named.	Skin gray, without scales.
Length, 70 to 80 feet.	Length from junction of head and neck to tail, part of which was wanting, 55 feet.

PLATE 4.



1. The Stronsa Animal, from reported admeasurements and description, 55 feet.
2. Fossil Skeleton of PLESIOSAURUS, 35 feet.
3. The Stronsa Animal, as drawn in Transactions of Wernerian Society.

The other points embraced by the affidavits of the Stronsa fishermen and inhabitants were, that the eyes were not larger than a seal's—there were two *spout*-holes on each side of the neck, one and a quarter inches in diameter, and one on back of the skull; the flesh like coarse ill-coloured beef, interlarded with fat or tallow; had no affinity to fish when put into the fire, neither flamed nor melted, but burned away like gristle. The stomach, four feet long, and thick as a firkin, divided right across by a membrane three-sixteenths of an inch thick, and of same substance as stomach itself. It contained a fetid liquid like blood and water, and at either end was the appearance of a gut; a large bone was brought from the carcass, which was considered as the collar bone.

When the account of this animal wreck reached Edinburgh, competent parties were sent to Stronsa, by whom the above particulars were gathered, and such portions also of the remains as could be preserved were brought to Edinburgh, and submitted there to the examination of the scientific public of the day. Dr. Barclay's notices upon these fragments are as follows:—

"The vertebræ of the back are without any processes, either transverse or spinous, capable therefore of inflection in any direction; united by an intervertebral ligament one-half to three-fourths of an inch thick; the osseous portion of the vertebræ soft and porous, and the cartilaginous part predominating. Though on a cursory view, these vertebræ present characters common to most fishes, there is one marked exception, besides the total absence of processes, viz., the inequality of size of the vertebræ, a large one being interposed between two small ones, and a small one between two large ones; the reason of this conformation Dr. B. cannot explain, unless it be to favour the action of the museular fibres, which by this contrivance must have entered the two contiguous vertebræ at less acute angles than if they had been more parallel to the axis; if so, this arrangement of vertebræ becomes a substitute for the wanting processes.

"The dried and shrivelled head is only twelve inches from first cervical vertebra to farthest part that remains of jaw; the broadest part of the head in its present state seven inches.

"The first cervical vertebra is two inches in diameter, some of the others are six and a half; bristles of the mane unlike the radii of a fin; there is some indication of a sternum." Though Dr. Barclay considered the facts too indeterminate for a positive decision on the class to which this animal might belong, yet the presence of a neck (quoting Astedi) and the spiracula, inclined him to place it among the cetacea. It is right to

mention, that Sir Everard Home, and probably other naturalists, expressed their belief that it was a gigantic shark of the basking species, which are known to visit occasionally the British seas.

The author having very slender pretensions to a knowledge of comparative anatomy, will not presume to decide where such doctors differ, but would remark that, considering the great advances which have been made in this science, in common with all others, during the last forty years, there should be no difficulty, on a careful collation of all the characters of the Stronsa animal from the original documents, and from the relics, if still preserved in Edinburgh, for skilled naturalists to determine at least the order to which it belongs.

It may be permitted, in the meantime, to offer the following suggestions on the foregoing description.

The existence of spiracles inclined Dr. Barclay to place the Orkney animal among the cete. They are noted as two on each side of the neck, and one on the top of the head. Does not this arrangement correspond with that belonging to the lampreys, which have their branchiæ so placed, as well as possessing the spiracle in the head? The family of sirens also possess both branchial apertures on the side of the neck, and internal lungs also. The presence of spiracula, therefore, *especially in the neck*, does not necessarily imply the affinity of the Stronsa animal with the cete; and in the particulars preserved of the various appearances of the sea serpent, only in two instances is anything like spouting or blowing referred to; one of these is Hans Egede's somewhat apocryphal account, and whose animal, stripped of exaggeration, may probably be set down as a "whale breaching." The other is in the statement taken from Silliman's Journal of the year 1835. (See page 28.) Besides, from the extreme rarity of the appearance of the supposed sea serpents, it is evident, if such a genus does exist, its usual habitat must be in the lower strata of waters, and it is there we must seek its congeners.

Eminent naturalists have devised various schemes for classifying the animal creation. Adopting for our present subject the connecting groups of Swainson, we observe that in his ichthyological arrangement, he appears to meet with a considerable hiatus between the cartilaginous fishes and the amphibious reptiles, and he has recourse to the fossil saurians to complete his series, though even with this help, the connection is unsatisfactory. Of the hydri, he says "Between the terrestrial snakes and the aquatic enalosaures, there is a group of serpents which departs most materially from the rest of the order by being aquatic; not merely frequenting the water, but living entirely in it, and possessing a structure suited to

their habits. The water serpents constitute, in our opinion, the nearest approach to the aquatic or swimming lizards." Might not that singular family of the batrachia, the sirens, have been mentioned here also, which with serpentiform shape, have also the rudiments of legs; and in some species two or four small limbs, much disproportioned to the size of the body? In point of dimension, both the sirens and the hydri fall greatly short of the fossil saurians, and these being extinct, (as it is supposed,) there still remains a wide gap between the cartilaginous fishes and reptiles, untenanted (as believed) by living forms. It appears, therefore, worthy of consideration, whether the Stronsa animal may not have claims to be placed in the vacancy which, in Swainson's arrangement, (and also in more lately proposed systems,) exists between the two groups above mentioned. If such a claim be admissible for the Stronsa animal, it may at once be made for the congeners of that animal, the American and Norwegian ophidians.

No doubt, the fossil saurians are generally considered to have been reptiles, breathing the atmospheric air, and living on or near the surface; but as we have no other data than their ancient skeletons to judge by, it may be open to question, whether some of this family did not dwell at the bottom. It is not altogether to be disregarded in this view of the subject, that the external form of the Stronsa animal, carefully restored from the preserved admeasurements and other particulars, so far as it can be compared with the osseous structure of the fossil remains, assimilates nearer to that of the plesiosaurus than of any other animal form with which we are acquainted.

SECTION V.

SEA SERPENT—*Continued.*

Difficulties of the Question—Rarity of Appearance—Parallel Instances—Northern Chimæra Stenoptyx—Riband Fish—Whale of Havre—Possible Causes of Rare Appearance—Parasitical Infesters—Electric and Volcanic Agents—Destruction of Haddocks—Fishes of Ancient Geological Formations—General Conclusions as to the Sea Serpent—Other Probabilities—Submarine Animal Kingdom—Zoophytes—Surprising Forms of Organic Life—Agassiz's Remark—Conclusion.

"Awful shape, what art thou? Speak!

* * * * *

Descend, and follow me down the abyss."

Shelley.

There remains an important point to be considered in treating of the probability of the existence of so large a marine animal as the sea serpent, even in its most reduced dimensions, must inevitably be, and this point is the rarity of its appearance. Whether allied to the saurians or to the hydri, whether it be a true cete, or even, as has been suggested, some overgrown individual of the conger tribe, which had attained a size far exceeding (like the pike of Heilbrun lake) the ordinary bulk of its species, the surprising rarity of its visits to the surface is still a stumbling-block in the way of any of these conclusions as to its identity. Yet this rarity of appearance is not without parallel in the annals of ichthyology. Passing by the shell-fish, asterias, medusæ, and other mollusca, some species of which are known only by one or two specimens, and the British fauna of which is yearly added to by the indefatigable dredger of many years' standing, around our coasts, there are several classes of fishes whose appearances are as rare as those of that nondescript which, for want of better knowledge, we term the sea serpent. The coasts of Norway furnish us with one instance in the Northern Chimæra, no bad type in other respects, of the sea serpent; "for," says Swainson, "it is remarkable for the singularity of its appearance, which gives as much the idea of a reptile as of a fish. It grows three or four feet long, the head large and obtuse, but the body terminating gradually

in a long slender filament. It lives in the deep recesses of the ocean, and is seldom seen to approach the shores, except during breeding time." It is described also as a nocturnal fish, chiefly seeking its prey at that season.

In the first volume of Magazine of Natural History, a singular fish of serpentiform shape is described, having been caught in Davis' Straits, during one of the late expeditions in that quarter, and which was probably a variety of the chimæra. It was four and a-half feet long, with a purplish black granular skin, small fins, and slender tape-like tail, continued one foot eight and a-half inches beyond the extremity of the dorsal fin. The Sicilian species of stenoptyx, one of the salmonidæ, besides the singularity of its form, is so exceedingly rare, that it was only met with twice during six years, by an inquiring ichthyologist, cast up on the shore opposite Reggio, both times after *violent storms*. Another species among the pikes is so rare, that but one figure of it existed, and Cuvier never saw it. Swainson met with it twice in five years.

The large-eyed pomatome never scarcely leaves the deep sea; at Nice only two specimens were met with in thirty years. Of the riband fish the same naturalist says, "Its body is not thicker, except in the middle, than a sword; and being covered with richest silver and of great length, the undulating motion of these fish in the sea must be exceedingly beautiful and resplendent; but these, and all the wonders of the mighty deep, are almost hidden from the eye of man. These meteoric fishes appear to live in the greatest depths; and it is only at long intervals, and after a succession of tempests, that a solitary individual is cast up on the shore with its delicate body torn and mutilated." One was killed off Plymouth, swimming rapidly on the surface, by an oar; it was found to be infested by parasitical insects, which fact suggests one cause likely to drive the oceanic monsters to the surface. Other instances of a similar nature might easily be adduced; but with a short account of the solitary representative of a species of cete, the list will be closed. This whale was stranded at Havre in 1825, and is termed in the Naturalists' Library the toothless whale of Havre, having no baleen (whalebone) and no teeth. It was delineated by the younger Cuvier, and its skeleton is deposited in the Paris museum. Its length was 15 feet, and its circumference $7\frac{1}{2}$; it was a young animal; the head, which was *distinguishable from the body by a marked neck*, was $2\frac{1}{2}$ feet long from extremity of the beak to the occiput; the body largest in the middle, became smaller at both extremities; the muzzle round, long, straight, resembled a bird's beak; the spiracle 2 feet 3 inches from the extremity of the beak; the eye large, with upper eyelid; no trace of ear; the pectoral fins small in proportion, being only

18 inches long by 6 wide; the dorsal also very small, 1 foot high; the general colour gray; dark above, and gradually becoming whitish beneath. This beautiful and elegantly-shaped animal possessed all the brilliancy of tint and softness which characterises the cetacea. It is the only known individual of a single species which seems to connect the dolphins with the whales. It would appear very rare; and of its habitat, disposition, and habits, we know nothing." (See plate.)

Speculating on the causes which may operate to draw the habitual occupants of the lower depths of the sea to the surface, we may imagine several—there may be causes connected with the propagation of the species—(parasitical tormentors have already been alluded to); but the most potent influence which can be supposed to act on such fishes, is that arising from electric or volcanic phenomena. Yarrel observes that such fish as inhabit the bottom of waters have a low standard of respiration, and a high degree of muscular irritability. In such animals there is reason to believe there also exists great susceptibility of any change in the electrical relations of the medium in which they reside. The restless movements of eels, loaches, and other ground fish, during thunder storms, are well known. There was a remarkable instance in the almost total destruction of the haddocks of the North Sea, about sixty years ago, of the agency of some mysterious cause at work beneath the waters, inappreciable, except in its terrible effects, on certain of their inhabitants. Vessels sailing to Archangel in 1789 describe their passing, for hundreds of miles, through a sea covered with the floating dead haddocks. The records of the fossiliferous rocks also testify to similar general destruction occurring suddenly and at once to whole races of fishes, whose unmutilated remains, quietly entombed in the subsequent gradual deposition of their rocky sepulchres, assure us such mortality was not produced by violent mechanical causes, but occurred during the usual tranquillity of those ancient waters, thereby verifying the declaration of the Psalmist, who, speaking of the animal races in the 104th Psalm, continues in words significant of successive creations:—

"Thou hidest thy face, they are troubled: thou takest away their breath, they die, and return to their dust.

"Thou sendest forth thy Spirit, they are created: and thou renewest the face of the earth."

It is quite in harmony with the hypothesis, of the lower strata of ocean waters being the habitat of unthought of creatures, whose rare appearance at the surface is induced by some common cause, that all the noted

instances of the visibility of the sea serpent have been invariably after a series of warm, calm, and bright weather; and this uniformity of circumstance (of which more might be said), unsuggested apparently by previous accounts, is one of the strongest testimonies we have to the general good faith in which the different statements have been given.

Reviewing all the evidence we have been able to collect for a short memoir on this curious subject, there certainly appears sufficient to justify the belief that one or more large marine animals do exist, whose habits rarely bring them within the observation of mankind. If favourable opportunities hereafter should ever allow of a satisfactory solution of the question, it is probable the creature known popularly at present as the sea serpent will be found to belong either to the cetacea or to the cartilaginous order of true fishes; though as has been hinted at in the foregoing pages it may turn out to be a saurian, or the representative of altogether a new genus to be interposed, as the extinct saurians are by some, between the cartilaginous fishes and the water serpents. Reasoning from what we at present know of these orders, there are great difficulties in the way of any of the foregoing conclusions, except perhaps in the single case of the small serpent found near Boston, (see page 37) which, if a connection could have been actually established between it and the pelagic monster seen off the coast just before, would undoubtedly have been entitled to admission both for itself and its gigantic parent into the order of hydrophidiæ, though even then the want of the flattened and paddle-like tail would have presented a remarkable aberration from the form of the known members of this family. Perhaps the conclusion we might come to, which would best evade the difficulties that beset us, is the probability of the existence of at least two unclassed marine animals, the one decidedly ophidian in its characteristics—a true water-snake of huge dimensions, such as appears to have been seen off Gloucester harbour, U. S., in August, 1817, and that detailed to Professor Silliman in 1835, whose probable size did not exceed fifty or sixty feet in length. To this class the Norwegian appearances also generally conform, though after making due allowance for exaggeration, they certainly betoken a larger variety.

The other animal, more apocryphal as a sea serpent, may find a representative, until a better be produced, in the Stronsa derelict.

But during these researches we have also noted traces, indefinite and mysterious though they be, of other existences of very different nature, and which suggest the probability of there being a distinct animal and vegetable kingdom existing in the deep abysses of ocean, indications of whose inhabitants are indeed offered to our momentary observation in

the rarer forms which at long intervals are seen on the surface or in the shallows, but the whole wonders of which we can never know.

In the lowest division of the animal kingdom we indeed see sufficient to be aware that forms of life may exist under very different conditions to those of the higher races, conditions (temperature excepted) altogether at issue with our usual experience; and descending one link lower in the chain of existences which connects the animal and vegetable worlds, we find the most discordant monsters that a troubled imagination ever conceived, actually in "esse," as for instance, the corallines and sponges—difference of opinion exists—but the balance of observed facts seem in favour of these forms *being each one animal*, with its million heads protruding from its calcareous or moss-like covering, with endless motion of cilia seeking its prey.

In respect of the possibility of creatures of comparatively high organization residing habitually at immense depths of the ocean, much speculation might be entered upon and much objection raised, and certainly the writer does not feel himself competent to deal dogmatically with either; but for an authority, in treating on these subjects, against scornful incredulity which, believing nothing, and inquiring into nothing, will discover nothing and settle nothing, we may well remember what the celebrated Agassiz said to that truly original inquirer into nature, the author of "Walks in the Old Red Sandstone:" "Do not be deterred, if you have examined minutely, by any dread of being deemed extravagant, the possibilities of existence run so deeply into the extravagant, that there is scarcely any conception too extraordinary for nature to realize."

Incompatible as we may imagine at first thoughts, the continuance of organic life, endowed with the power of voluntary locomotion and the capability of receiving sensuous impressions, to be, at the bottom of the sea, with the conditions by which it must be there surrounded; we have seen sufficient in the structure of the animal forms of our upper world to know that, by means of those wonderful compensations so indicative of Creative Wisdom, the living creature can be adapted to its habitation, and can there fulfil the purposes for which it was made.

Yielding for the moment to the promptings of the imagination, we may presume, in the language of science, that the submarine kingdom is one abounding in the lower forms of organization, and our inferences would add, of dimensions expanded beyond all previous conception.

Deprived of the solar rays indeed, but irradiated by phosphoric brilliance, and stimulated by warmth derived from the centre, here forests of

coral and gigantic sertulariæ and other ramifying polypes, not without the softer forms of zoophyte flowers and true vegetable fuci, may still afford haunts to the huge cephalopods, colossal stellerides, the lengthening annelides, and the ophidian monsters—lords of this lower world, preying on the smaller creatures and on each other, and realizing some of the conceptions formed of a previous geological period. Not, however, until another change reverse the present level of land and sea, can it be certainly known, if there then shall be on this planet those capable of knowing, how far these conjectures are right; but of one thing we may rest assured, that "He who causeth the solitary rose to blossom in the desert, and the rain to fall where no man is," hath given to his creatures, even at the bottom of the waters, an organization and a habitation mutually adapted, and whether to be revealed to, or hidden for ever from, the eye of man, they are all equally illustrative of the infinite perfections of the Creator.

SUPPLEMENTARY SECTION.

THE "DÆDALUS" SEA SERPENT.

They that go down in ships, and, wand'ring far,
Successive sink behind each well-known star;
Who steer from land to land in every clime,
And brave the winds and waves at every time;
Who spend the chiefest part of life's short days
In constant tracking ocean's lonely ways—
These, as the Psalmist sings, the wonders know,
Which nature in the mighty deep can show;
And these can vouch, the Lord of earth and heaven
The sea hath also made, and to us given.

M. S.

As the publication of this essay was induced by the remarkable occurrence reported by Captain M'Qhae, of her Majesty's frigate "Dædalus," the subject cannot be closed without a few observations on this new appearance of a "sea monster." It has, however, given rise to so many valuable notices in the newspapers and periodicals of the day, some of them contributed by writers of high attainments in science; and repeated discussion has narrowed the question of identity of species so nearly to the point, beyond which only closer observation could have carried it, that the author would rather have left the matter where it is, but for the consideration, that if any thing here written on the question generally, should attract attention at all, some remark on this particular phenomenon, so stimulant of public curiosity would naturally be expected.

Taking for a text, therefore, in the first instance, Captain M'Qhae's own account, and examining how far the creature seen by him accords with the characters and circumstances of the previously reported appearances of the sea serpent, it may be observed that the locality is new, and the weather, instead of being calm and bright and warm, was dark

and cloudy, and the sea rough. Then, although sixty feet of the length of the animal were estimated to have been seen at one time above the surface of the water, neither the undulatory motion, nor the characteristic protuberances of the quasi sea serpent, were noticed; lastly, the sketch given, with Captain M'Qhae's approval, in the *Illustrated London News*, of 28th October last, does certainly not convey the idea of the original having been a serpent or any other reptile. Captain M'Qhae, however, continues in this belief; and Lieutenant Drummond, whose account of the appearance varies materially from his chief's, nevertheless received the impression at the time, that the shape of the animal was serpentiform. These opinions, formed on the spot, and on the general *coup d'œil* of the living and moving creature, should have their due weight on our judgment.

Professor Owen, whose scientific reasoning, and reasonable conjectures, in the opinion of many persons, may be thought to have exhausted the subject, repudiating the idea of a cete, and not alluding to the possibility of a selache or shark, finds an easier solution of the question of the identity of the "mysterious stranger" in the alternative of a shipwrecked sea elephant. Having had a recent opportunity of examining the specimen of this species of seal, which is in the Liverpool Museum of Natural History, and is, perhaps, the largest and best preserved in the kingdom, the author can raise no objections to this hypothesis, except in relation to the size, which, in the fullest-grown individuals, is not half that estimated by Captain M'Qhae to have been the dimensions of the "Dædalus" animal. How far his estimates may have been overrated is open to question, but according to the experience of those conversant with marine matters, the tendency in judging of objects seen floating at sea, and just "a-wash," is to underrate their bulk rather than to exaggerate, and more especially so in rough weather. The colour of the sea elephant preserved at Liverpool, is dark brown throughout; and so Dr. Traill describes it when the animal was first brought to the museum, about twenty years ago. Below, upon the belly, the hair shaded away to a yellowish bay colour.

It may also be doubted whether this seal ever swims at the rate of twelve or fourteen miles an hour; and in the particular instance before us, such velocity is still less likely, seeing that the seal, if a seal, must have been more or less exhausted; and is described as going against a strong head swell, with the wind abeam.

Turning to Lieut. Drummond's version, as communicated to the Athenæum in December last, we read as follows:—

"Extract of log of Lieut. Edgar Drummond, ship "Dædalus," August 6th, 1848, lat. 25° S., long. 9° 37′ E. At about 5 P.M., observed a most remarkable fish on the quarter, crossing the stern in a S.W. direction; appearance of the head, which, with *back fin* was the only portion of the animal visible, long, pointed, and flattened on the top, perhaps ten feet long, upper jaw projecting considerably; fin perhaps twenty feet in rear of the head, and visible occasionally. * * * * The upper part of the head and shoulders appeared of a dark brown colour, and beneath the under jaw a brownish white. It pursued a steady and undeviating course, keeping its head horizontal with the water, and in rather a raised position, disappearing occasionally beneath the wave, and not apparently for purposes of respiration. It was going at the rate of twelve or fourteen miles an hour, and, when nearest, was perhaps 100 yards off, and in fact gave one quite the idea of a large snake or eel. No one in the ship had ever seen any thing similar, so at least it is extraordinary. Visible to the naked eye five minutes, and with the glass fifteen more. Weather dark and squally, with some sea running."

In a former section of this Essay, was described a rare species of whale, called the Havre whale, a representation of which, copied from the Naturalists' Library, is given in plate 2, fig 1. On the authority of that work, it was stated that this was the only known individual of the species. In the appendix of Ross Browne's Whaling Cruise, may be found an enumeration of the various species of cete, known to the whalers of the southern seas. Beale and Shaw are quoted as the authorities for the descriptions; but they thus have the additional value of the confirmation of a practical whaler. The two following species frequent the Southern Pacific, and Atlantic oceans. "The rostrated mysticete: by far the smallest as well as most elegant of the mysticete or whalebone whales, being only known to attain twenty feet; head, upper part of back and fins, and tail dark or bluish brown, but sides and abdomen of beautiful white, with a very slight tinge of pale rose, or flesh colour, and are marked for more than half the length of the animal by very numerous longitudinal plaits or furrows; eyes small, also *the head and snout much more elongated* than in any other species, generally tapering to the extremity, which is slightly pointed; back fin small, situated no great distance from the tail; pectoral fins small and narrow, and tail divided into longish or pointed lobes. The whole animal has an elegant fish-like form, and has none of that uncouth appearance which prevails in the larger species."

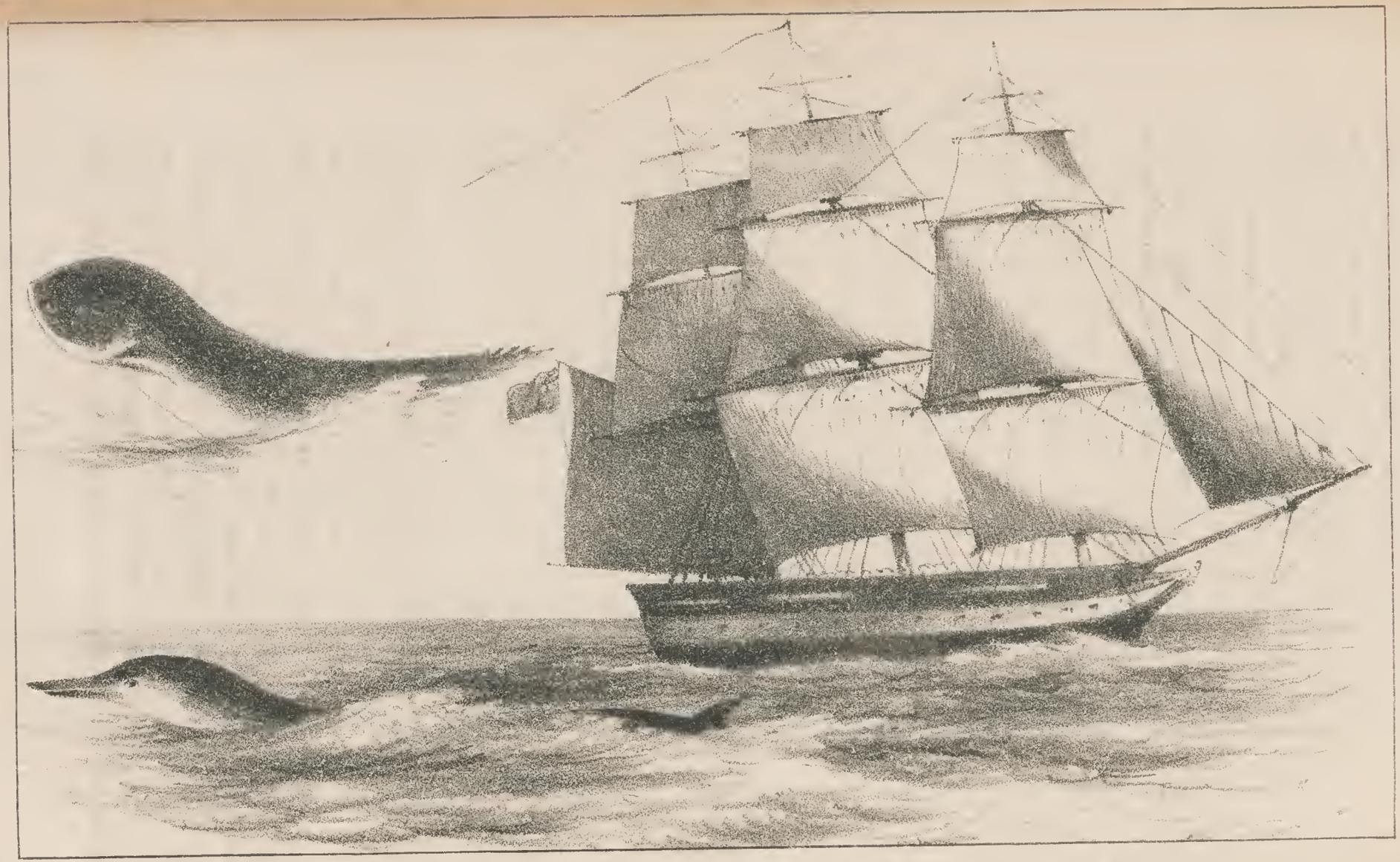


PLATE 5.

The "Dædalus" Animal, drawn from Lieutenant Drummond's statement and estimates, on the same scale as the representations in the "London Illustrated News," of October 28: with the head as shown in the latter publication.

If it were not that the rostrated mystieete is a whalebone whale, while the beautiful specimen cast ashore at Havre is expressly mentioned as possessing neither baleen nor teeth, there would be no difficulty in coming to the conclusion, that the two descriptions referred to one and the same speeies: that they do differ in so important a characteristic, while assimilating closely in external form, is a remarkable illustration of the futility of attempting to classify by outward appearance alone, as well as an instance of the numerous subdivisions into which the cetacea may be separated.

The other whale mentioned by Browne, is termed the "pike-headed." It runs fifty feet or upwards in length; is moderately slender, somewhat thick in the forepart; colour black above, and white beneath; head moderately large, gradually tapering in form, and ending in a somewhat broad or obtuse tip. It is very timid.

Before going into the consideration of the characters which may be deduced from Lieut. Drummond's account, it is desirable to ascertain from the joint impressions of himself and Captain M'Qhae, some definite idea of the size of the creature they saw. Captain M'Q. estimated that at least sixty feet of the body were visible *à fleur d'eau*. Lieut. D., more precise, gives a length of ten feet to the head, and a distance of twenty thence to the fin, making in all thirty feet visible; supposing the dorsal fin to occupy the average position of three-fourths of the whole length of the body, reckoned from the anterior extremity, we obtain ten feet more, which would give an animal forty feet long: then the characters obtainable from Lieut. D.'s statement are these: head flattened, and one-fourth of the total estimated length of the animal; snout long and pointed, the upper jaw being prolonged; appearance of a neck, at the base of which the body is enlarged; a dorsal fin; colour dark above, and dull white below the jaw.

Adopting either Captain M'Qhae's or Lieut. Drummond's estimate of dimensions, the size far exceeds that of any known seal, living or dead; and the existence of a dorsal fin would, of course, be fatal to the seal hypothesis at once; but there is nothing in the above characters or size unfavourable to the supposition that the animal seen was one of the cetacea—and particularly of those species which appear to be placed between the whales and the dolphins, claiming affinity with the former in respect of size, and with the latter in respect of form and velocity of movement; and undoubtedly the probability of a rare species of whale being seen in the latitude and longitude noted, is much greater than that of an

antarctic seal. But it will be asked, If the "Dædalus" animal was a whale, why was no blowing observed? To this query more than one answer may be given. The creature was only seen during ten or fifteen minutes, and longer intervals than that frequently occur between the acts of respiration of the larger whales; but this phenomenon, in the smaller cetaceous animals, is in many instances not seen at all, as, for instance, in the porpoises and dolphins; and it may be taken as a general rule, that the smaller the whale the less perceptible is its blowing—moreover in the present case, the roughness and spray of the waves would all tend to render the respiration invisible.

That the appearance of the animal seen from the Dædalus, swimming with such velocity on the surface, with the head above the water, was extraordinary there can be no question; but supposing it to have been a cete, a reference to the habits of the better-known species may help to explain the wonder. Beale, speaking of the spermaceti whale, states that when "gallied," *i. e.* frightened, it will swim at the surface at the rate of ten or twelve miles an hour, the head rising alternately above and sinking below the surface in accordance with the powerful strokes of the tail acting vertically on the water, and the whale is then said, in fishers' phrase, to be going "head out." Thus, then, an unusual exertion of its swimming powers may account for the continuance of a cetaceous fish on the surface, and for the projection of its head.

But indeed these large creatures of the deep display at times strange vagaries, and, under the stimulus of terror, anger, pain, or sexual feeling, depart widely from their ordinary grave and leisurely movements. The writer of these pages has seen the huge finners of the Atlantic, in calm weather, spring perpendicularly their full length out of the water, exhibiting for a moment the whole of their enormous bulk, and then, falling prone on the surface, make the water boil like a pot, while the sound produced by the collision was equal to the report of a large piece of ordnance.

In 1829, when about the latitude and longitude of the Banks of Newfoundland, the writer also witnessed the singular action of a large fish, which he has never seen or heard described since. It occurred in the broad daylight of an afternoon in May or June, the wind blowing strong from the south-west, and ship closehauled on larboard tack. Most of the crew were aloft double-reefing the foretopsail, when one of the men hailed the quarter-deck, that there were breakers to leeward; on looking with the glass in that direction, the writer saw the spray flying exactly

as if on a rock about a mile on the lee-bow, and the ship appeared to be rapidly drifting down upon it—so much so, that the men were hastened down to set the topsail; but before that could be effected, the supposed breakers were made out to be a large fish springing out of the water with incessant and tremendous leaps, making dead to windward, and in this manner it crossed the ship s bows within a quarter of a mile. But what constituted the most singular feature of the phenomenon was, that, while out of the water, the creature threw off such a cloud of spray, just like a Newfoundland dog shaking himself after taking the water, that neither shape nor size could be distinguished, though the writer watched it through an excellent spy-glass until it disappeared in the horizon to windward, still continuing the leaps as long as visible. Judging from the spray cloud in which it was constantly enveloped, it was the size of a grampus; and as sailors must needs give a name to what they see, it was set down as such; but whether a grampus, or a shark, or a colossal cuttle-fish, or a sea serpent, to this day the writer has no means of judging.

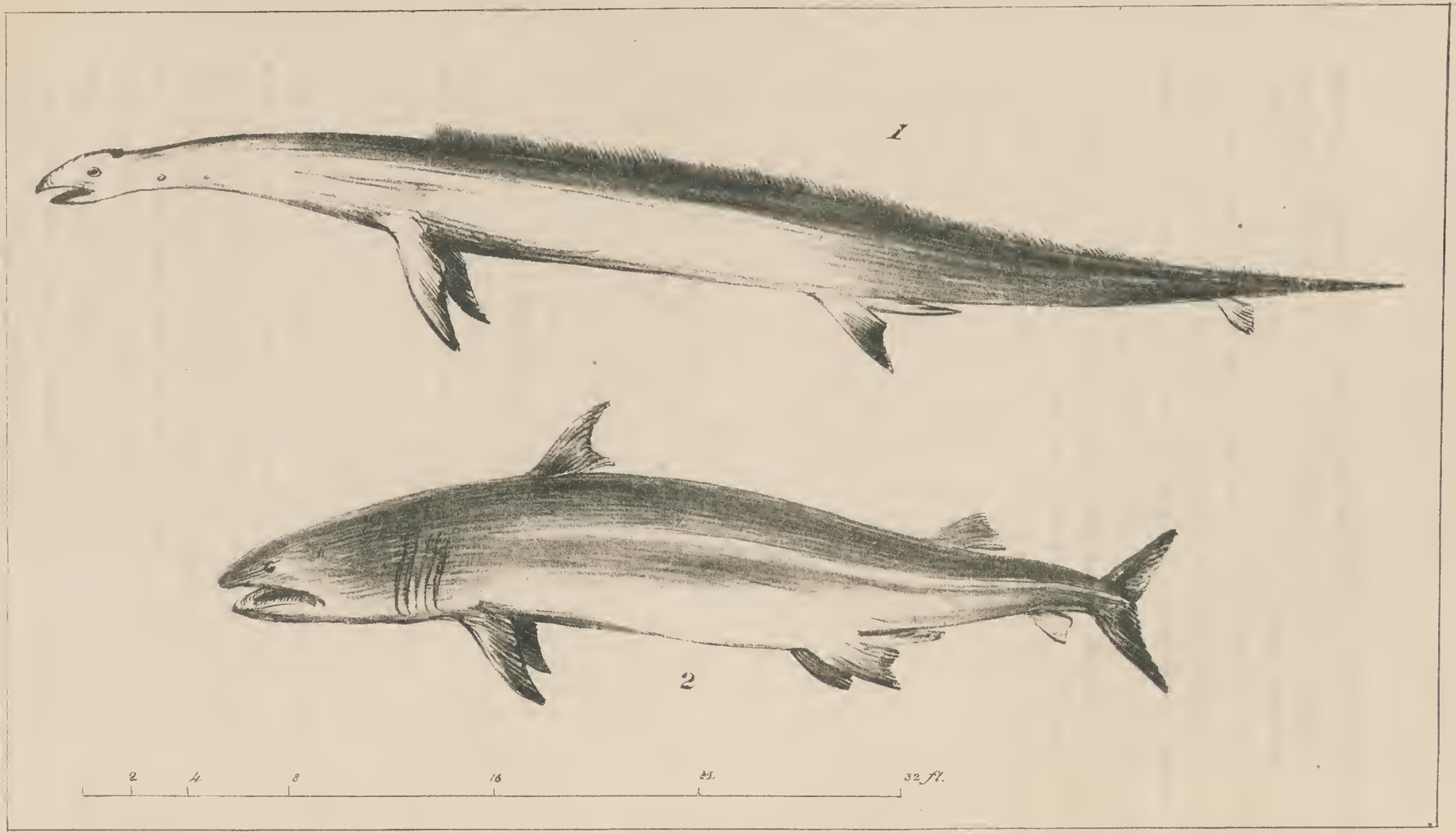
Now as to the "Dædalus" animal; while repudiating the seal hypothesis, it must be confessed it is easier to say what the creature was not, than what it was; indeed the statements of Captain M'Qhae and Lieutenant Drummond, both honourable men, differ so much from each other, that an inference fair enough if drawn from the one, will not correspond with both. With great deference it may be said, that Lieut. Drummond's description is more precise; and were there no other data upon which to form an opinion than those supplied by him, the appearance might, with great probability, be set down as that of a rare cetaceous animal—for experience teaches us that the most natural explanation of an unusual phenomenon is generally the correct one. The long head, the projecting snout, the dorsal fin, the estimated size, the enlarging trunk, the depression of the caudal extremity beneath the water, and the position when seen, all correspond with the idea of the animal being cetaceous, while the unusual circumstances under which it was seen have been shown, by the analogous case of the macrocephalus or sperm whale, to be not altogether contrary to the habits of the genus. But when we refer to Captain M'Qhae's account, and to the sketch of the appearance as authenticated by him in the *Illustrated London News*—with its small head and obtuse muzzle, the tapering neck, and the dorsal fringe or mane, and the estimated size—the conviction becomes strong, that in most of the characters, the "Dædalus" animal closely resembles the Stronsa derelict described in

the Wernerian Transactions, and which remarkable creature does not seem hitherto to have been satisfactorily classed.

Professor Owen, in his interesting letter to the *Times* of 14th November, referring to these remains still preserved in Edinburgh, declares them to belong to a selache or basking shark. We are told by lawyers that a well-connected chain of circumstantial evidence is more satisfactory for the establishment of a fact than even direct testimony; so, probably, the skilful inductions of the comparative anatomist, leading us from the study of a single vertebra to the reproduction of the whole organization, justly engages at once our admiration and the concurrence of our judgment. Nevertheless, as the reconcilement of direct with circumstantial evidence removes from the mind all lingering cause of hesitation, it would be very desirable to learn how the recorded characters of the Stronsa animal can be made to harmonize with the descriptions and representations of the basking shark, which recent opportunities have enabled able zoologists to give with great truth and exactitude. In the accompanying plate, (No. 6, fig. 2.) is a drawing of the selache or basking shark, copied from Yarrel; and in juxtaposition is a figure of the Stronsa animal, restored from the admeasurements and descriptions taken on the spot where it was found, but designedly drawn to assimilate it as far as possible with Fig. II. It will be seen, however, that the disagreement is very great, and in most essential particulars. The size, the neck, the dorsal fin, the branchial openings, and the general form of the basking shark, are altogether different from these characters in the Stronsa animal; but these and other distinctive marks may all be found fully discussed in the Wernerian Transactions for 1809-11. Its identity with the selache was controverted and considered at that time, and we are not aware that the question has ever been settled by common consent since.

The non-discovery of any remains corresponding with the popular idea of a huge marine ophidian, has been stated as a reason for disbelief in its existence; but strong as this argument certainly is, it is not stronger than that derived from the rarity of the appearance of the supposed animal itself. If there be indeed such a creature, or indeed any huge pelagic monster *sui generis*, and not merely a variety of well-known species, such as the whale or shark, it must be an occupant of the depths of the ocean, as has been urged before, and whose visits to the surface are accidental. The monstrous dimensions of such a creature would necessarily imply slowness of growth, length of generation, and few representatives of species. Living and dying in the deep abyss, its body preyed upon by the

PLATE 6.



1. The Stronsa Animal, 55 feet, from admeasurement and description, but drawn with a view to assimilate as much as possible to the form of the Basking Shark.
2. Selache, or Basking Shark, 35 feet.

carnivora of the submarine world before the gases of corruption could float it to the surface, the bones probably cartilaginous, and dissolving away long ere the slow currents of ocean could carry them up the steep ascent of the submarine gorges of the Norwegian mountain coast (the most probable habitat of the sea-serpent) to the shore, it is quite explicable how no recognisable remains of it should as yet have been discovered. If, on the other hand, the unknown thing should be a saurian, we may already have looked upon its relics in some of the fossils of that numerous race. But in respect of the absence of the remains of a particular class of creatures, have we not an example in man himself? While every ancient animal tribe has left its form as a record of its existence, and even the insects and creeping things of a past creation have inscribed their slight but indelible marks on the rock, where is the material witness of antediluvian man? There is none; not a bone or a fragment of himself, nor a trace of his handiwork, is found; although his race, strong in the fresh and newly-implanted principle of life, as testified in his longevity, and excelling in both the useful and ornamental arts, spread itself during nearly 2000 years over the face of at least one-fourth of the earth's surface. Yet, bowing with humbleness before the revelation of the Deity himself, we believe that man did exist before the Flood, and did many mighty works.

The more closely we examine the annals of natural history, and the records of creation, whether past or present, the more are we impressed with the conviction that the whole earth has been prepared for the existence of organic life, and the living creature adapted to its habitation. If we ascend the mountain ranges, we find the animal and vegetable races of the lower elevations replaced by others endowed with forms and functions conformable to their abode, until nature herself becomes benumbed by all-conquering cold. If we descend to the depths of the sea, as far as examination has been practicable, we find the same gradation; in respect of size, each tribe appears to have a place in the scale of depth most favourable for its development, above or below which increase of dimension is arrested. So well known is this to the ichthyologist, that to facilitate arrangement, he classifies the inhabitants of the waters into "surface, mid-water, and ground fish." The unread fisherman acts practically on the same truth; he does not look for cod near the surface, nor bait for mackerel at the bottom.

If, then, the last eight or ten years have added to our catalogue of the denizens of the waters many varieties, even among the "upper classes," some of which are of sufficient bulk to excite surprise that only now they

had come within our notice, as, for instance, the fish discovered by Sir John Herschell, at the Cape of Good Hope, eleven feet in length, and named Tetrapturus Herschelii; and again, that singular and suggestive creature, half fish, half reptile, the Lepidosiren Paradoxica,* frequenting the coast of Brazil, near the river Amazons—with how much greater confidence may we not believe that, in the deeper and more inaccessible localities of ocean, there exist races which must be nearly or altogether secluded from the observation of man.

It has been remarked that every race of animals on the land has also its type or representative in the waters. From the fabulous merman, and the seal, popularly termed the sea ape, representing the quadrumana, through a long list of sea elephants, sea horses, sea cows, bears, lions, &c., all mammalia; sea foxes among the squali, sea eagles among the rays, to sea toads and sea devils, we arrive at the lower forms of life, and in the nereides and annelides, we find analogues to the caterpillars and worms of earth. Why should the serpents alone be wanting? We have indeed hydri and ophidian forms; but no true ophidian, moving by undulatory motion alone, without the aid of fin or tail, has yet been found.† Yet if there be such—if a true serpent of the sea exist—it must live grovelling at the bottom, and participating in the doom of the race, "on thy belly shalt thou go, and dust shalt thou eat," and visiting this upper world like the ghost in Hamlet, only on permitted occasions.

Discontinuing, however, farther speculation of this kind, and returning soberly to our subject, it may be repeated, that there is very strong evidence for coming to the conclusion that there exist one or more large marine animals, seldom seen by man; and whose characters, so far obtained, are not sufficiently satisfactory to enable zoologists safely to assign them a place in their categories. The probabilities of the position of

* Lepidosiren Paradoxica—appearance of an eel covered with large netted scales; body furnished with four simple and elongated tapering legs, front pair placed on the back edge of upper part of the spiracles, and the hinder pair on under side of hinder part of the body; three feet long, and pronounced on dissection to be a fish.—*Transactions of Linnæan Society.*

† The serpent taken two miles from the coast of India by the crew of the "Bencoolen," of Liverpool, a year or two ago, the skin of which is now in the possession of the owner of that ship, was undoubtedly a land boa. In testing the evidence bearing on the existence of a marine ophidian inhabiting the Atlantic, there is some value to be attached to the consideration, that off the coasts of India—a locality very favourable for the production of marvels, and where water-snakes do exist of a magnitude sufficient to be at least *suggestive* of Pontoppidan's sea serpent—we are absolutely without any account of such appearances, either true or false.

these creatures among the families of the inhabitants of the sea, appear pretty equally divided between the sharks and the whales, and the claims of altogether a new living genus. Let us therefore not force conclusions prematurely, neither discourage observation and reports, by attempting to laugh down honest men who cannot tell their stories in the imposing language of science.

Scientific system is good and useful in natural history as in all other branches of knowledge, because it facilitates the acquisition of new data, and secures them when acquired; but a long familiarity with the technicalities of system has a tendency to close the mind against a ready reception of new combinations, for which an immediate precedent cannot be found. Yet the daily discoveries in the walks of philosophy should teach humility, and keep up a disposition to inquire with candour, and with earnest desire to pick out the grain of real value, even though surrounded with much which may be chaff. Never in this world can the attainment of knowledge be such as to destroy all occasion for faith in the existence of more to be learnt. The frequent new wonders of invention defy dogmatic incredulity, whether it obtrudes itself amid the researches of art or science. It is scarcely ten years since it was "satisfactorily" proved that steam navigation could never unite the old and new world. Yet already the voyage of the Atlantic mail-ships have become fixed subjects of admiration, not only in respect of the solution of the problem of ocean steam-navigation, but of the marvellous punctuality of departure and arrival. The establishment of the magnetic telegraph on land is a wonder of the past; and who dare now deny the probability of its extension through the other element of ocean? The race of man advances in the maturity of age; behold how his horizon enlarges, and how objects near to earlier generations, yet unperceived by them, are unfolding themselves to us! Inversely to the time by which we are separated from the day of the glories of Asiatic and Egyptian ascendancy, is our success in penetrating into the public history and the domestic privacy of those nations which flourished earliest on the earth. Is it not marvellous that we can judge Herodotus in his knowledge of Egyptian greatness, and Cicero and Pliny in their acquaintance with Etruscan antiquity? Yet so it is; while the stony book of the history of the planet on which we live, with its fossil leaves, was not only unopened by the ancient philosopher, but not even suspected to exist.

As in historical, geological, and geographical knowledge, we of to-day

outstrip those of yesterday, so also in respect of the organized works of creation. Our fathers, indeed, believed with childlike simplicity that there had been giants in a former period of the world's existence, and saw in the huge unearthed fragments of the Palæotheria the undeniable vestiges of their belief; but it has been left for us, figuratively speaking, to make the dry bones live, and to show the true giants of an earlier day; and in doing this, to render justice to our predecessors, by confessing that the old legends of monstrous forms and sizes were not all and altogether superstitious myths. Sinbad's roc has not existed; but America and Australia both bear witness to a bird as great in form and as powerful in structure. The Indian belief of the round world being supported by an elephant, which itself stood on a tortoise, may almost be excused when the Himalaya has furnished forth a chelonian eighteen feet long by seven feet high in the skeleton.

But are our discoveries of the marvels of animated nature at an end? Surely not; every year produces additions; from the deep sea, shells and molluscs, long believed to be extinct, are drawn forth still in the freshness of living existence. The Gallipagos Archipelago and the "continent" of New Holland continue to present types of organization, both old and new; and what may wander in the unknown interior of African and Australian deserts, or lakes, or oases, are still matter of curiosity and hope.

Neither is the sea then become barren to research; as there have been more things found in heaven and earth than were dreamt of in our philosophy, so also are there more in the waters; much may never be uncovered, but much, it is to be hoped, will. Be it the part of the true votary of the study of nature, to look to her for the development of all possible combinations of form and structure; yet, treading in the mediate path, not over credulous, or receiving superstitiously every wonderful tale. Touching the immediate subject of these pages, we need not, for instance, swallow the grave hypothesis of the French naturalist, who accounted for the foundering of the "Ville de Paris" and eight other ships taken by the English, by the supposition that they were sucked down by a schole of colossal cephalopods, over which they chanced to sail: yet, on the other hand, let us use the advantages of gathered experience, not rudely to reject the statements which honest though unscientific witnesses offer for our consideration, because those statements speak of things not already existing in our collections; but rather

let us encourage and promote vigilant observation of the phenomena which present themselves to the ever wakeful eye of the mariner—wakeful and watchful while the man of science is asleep—by that highest, yet simplest reward, a generous and thankful appreciation of the information offered to us by witnesses who can have no motive but to speak the truth.

Note.—The Illustrations generally, by the skill of the Artist employed, represent faithfully the ideas of the Author. In the sketch of the appearance seen by Captain Neill, Plate III., however, the figure is raised too much above the water; and in that of the "Dædalus" animal, Plate V., the head is not sufficiently flattened.

LIST OF PLATES.